INDIANA LIMESTONE



DETAILS AND DATA SHEETS TECHNICAL and other BULLETINS SPECIFICATIONS, STANDARDS, Etc.

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ARCHITECTS' SERVICE DEPARTMENT
P. O. Box 500 Bedford, Indiana

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A. I. A. Classification No. 8 b 2

Indiana Limestone Service Publication
Series D5
Drawings 1 and 2

INDIANA LIMESTONE
The ARISTOCRAT *of* BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 1
July, 1921

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

TYPICAL DETAILS FOR THE INDIANA LIMESTONE FACING AND INDIANA LIMESTONE TRIM FOR RESIDENCE WALLS

SHOWING THE APPLICATION *of* AN ENTIRE LIMESTONE FACING COMPARED WITH LIMESTONE TRIM OF BRICK-FACED WALLS

In the preparation of these details, no attempt has been made to standardize any particular form of facing or trim, or to feature a particular type of design but rather to show, in a general way, correct details of construction for a dignified but simple Limestone-faced design, also the application of Indiana Limestone trim on a somewhat similar Brick-faced residence design, the former having a hipped roof without parapet, which is more usual for this type of building, and the latter with a low parapet wall.

One of the most important points in detailing work of this character, is to have the Stone detailed and cut to fit the lay of the Brick insofar as depth is concerned. This will often require that the Limestone Facing in jambs and heads of openings must extend 8 inches into the wall, where 6 inches would suffice. It is much better to do this than to make the depth of Stone it reveals only 6 inches and require the cutting and fitting of Brick work in back of same. The extra inch or two on back of Stone may add a little to the cost of Cut Stone, but this will be offset by the saving in Brick and in mason's time for cutting and fitting, and consequently in the whole cost of backing up, thus resulting in a real saving in cost of the finished wall.

It should also be remembered that Indiana Limestone is a sawed material and that Quarry Blocks are sawed into slabs, which are later resawn to widths required, in the production of Cut Stone.

Therefore, Cut Indiana Limestone can just as economically be furnished with the backs sawed square to fit the lay of the Brick, and, in fact, usually is furnished in that way. For this reason, it is unnecessary and inadvisable to cut off the backs at angles, such as is customary in detailing of Granite or other Stone that is largely split up to size and shape, and then hewn or hand-cut from these rough blocks.

The customary thickness of Ashlar Facing for residence and ordinary commercial work, and the thickness of trim which does not project from the face of the wall is generally referred to as 4 inches. This actually should be made and usually is somewhat scant of 4 inches in order to fit the lay of the Brick.

Now that both Face and Common Brick have been standardized to a width dimension of 3¾ inches, it is becoming customary to saw 4-inch Limestone Facing as near to that thickness as possible, with the bonding courses approximately 8 inches in depth. Therefore, a 4-inch facing should be taken to equal a full 3¾ inches in thickness and with 8-inch backing, to lay up an exactly similar thickness of wall as 12 inches of Brick work, or 8 inches of Hollow Tile faced with Brick. All Cut Stone Contractors throughout the country have not as yet adopted the full 3¾-inch dimension as a standard. This is chiefly because Architects in some localities still insist on a full 4 inches, the same as when Brick were made to the 4-inch dimension. But the more general adoption of the 3¾-inch standard is assured, and this will tend to simplify the dimensioning of drawings and the laying out of work.

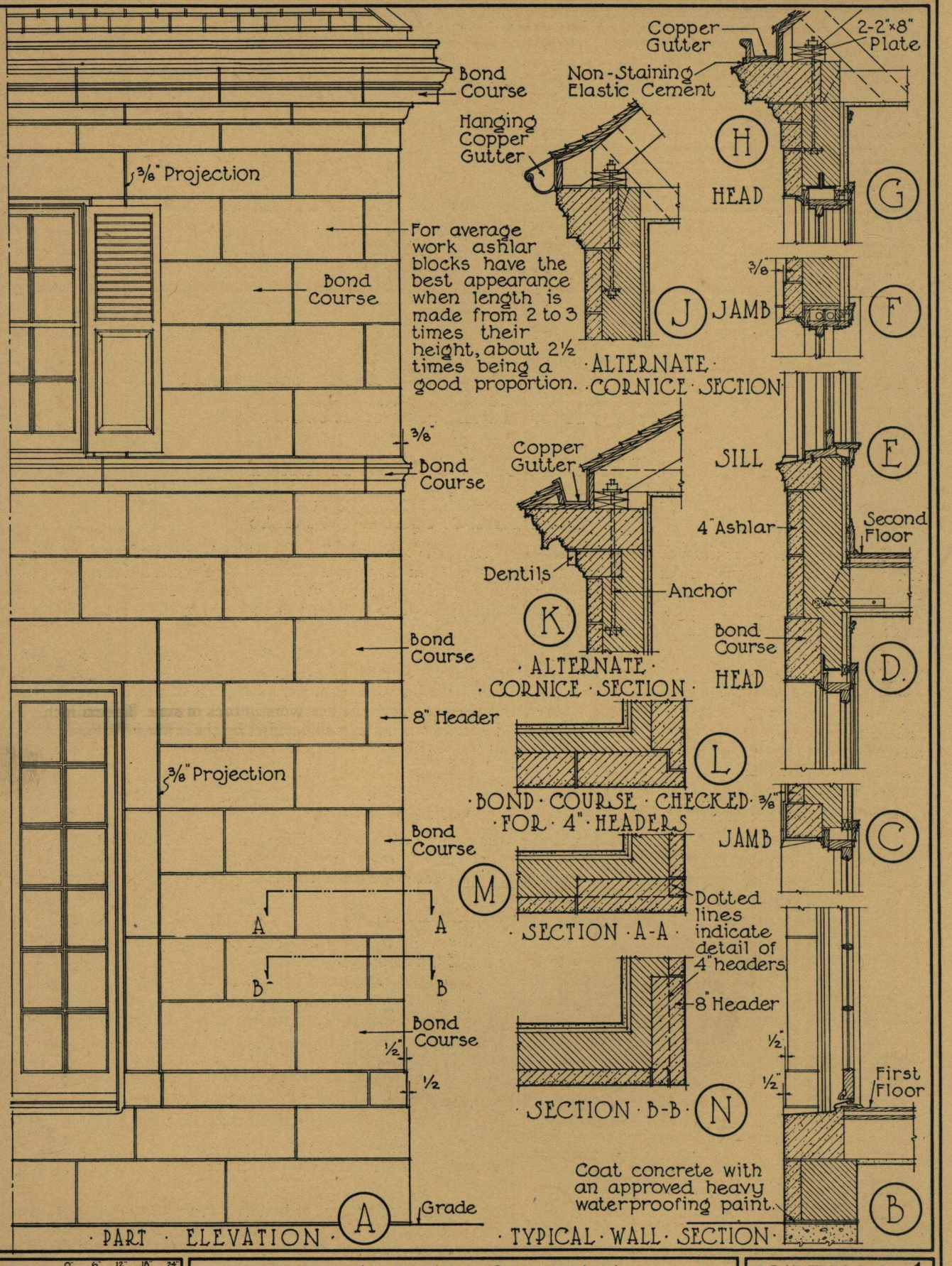
It is always advisable to lay out the courses of Cut Stone for trim of Brick walls in heights that will conform with the built of the Brick courses, as far as possible, as this simplifies the bonding and facilitates both economy and a more workmanlike job in the backing-up.

In view of the usual desire to have the heads of Ashlar Facing at corners of building show a depth greater than 4 inches, it is advisable to make all of these corner blocks 8 inches in depth the same as bond courses, where a 4-inch facing is used, as it does not pay to check out the backs for the slight saving in quantity of Stone stock that will result and then fill it in again with Brick work. Where 4-inch heads are to be shown, it is necessary to check out the corner stones in the bond courses to also show 4-inch heads.

For further description and reference to the different detail sections shown on Plate Drawings Nos. 1 and 2 see last page.

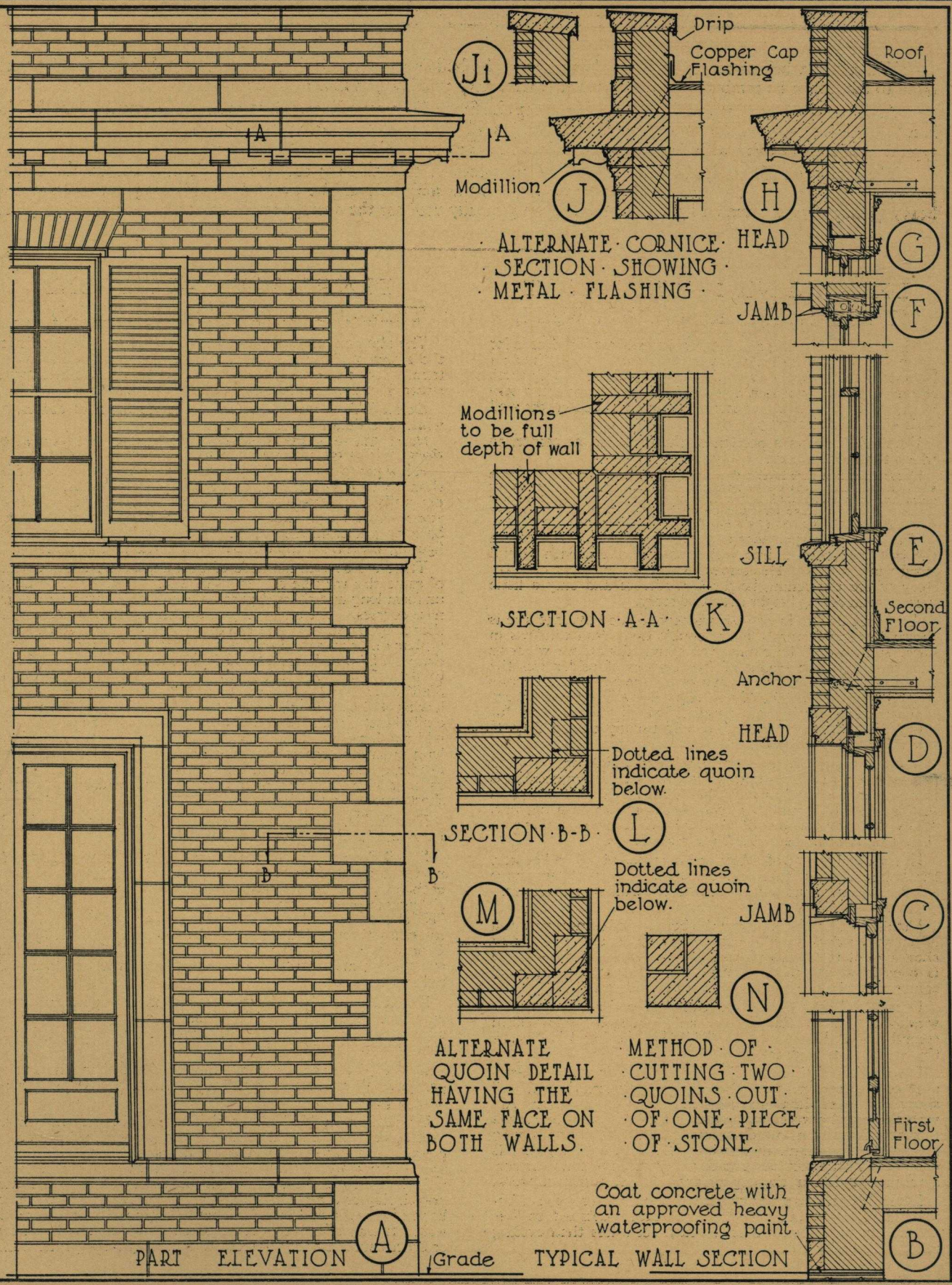
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INDIANA LIMESTONE



SCALE 6" 12" 18" 24" DATE-APRIL 15, 1921.	TYPICAL DETAILS OF INDIANA LIMESTONE FACING FOR RESIDENCE WALLS	DRAWING NO. 1 SERIES - D5 - 1

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SCALE 0" 6" 12" 18" 24"
DATE-MARCH 28TH-1921

TYPICAL DETAILS OF INDIANA LIMESTONE TRIM FOR BRICK FACED RESIDENCE WALLS

DRAWING NO. 2.
SERIES - D 5 - 2.

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Whenever a belt course is to be used as a girt to the building approximately midway in the height of wall, it can often to advantage be combined with the sills of second-story windows, as illustrated by details.

Architects will generally find it advisable to keep the Stone Cornices of Residences as simple as possible. A Modillion Cornice is shown on the Limestone trimmed Brick wall for the sake of variety and because it is customary to use a typical Modillion Cornice with designs in the Colonial or Georgian style.

The projection of Cornice Members should be restrained so that there is sufficient depth of Stone on the bed to properly balance same on the wall and all heavy projecting members should be avoided, as it is not practical to anchor heavy Cornices, etc., down on light walls such as are generally used for the average residence and other similar purposes.

DRAWING NO. 1—INDIANA LIMESTONE FACED RESIDENCE WALL

The plate on second page shows a series of typical details for the ordinary 12″ thick residence wall, consisting of a 4″ Indiana Limestone ashlar facing (*actually about 3¾″ thick, same as width of standard brick*) with an 8″ thick backing of common brickwork, the bond and corner stone having an 8″ bed on the wall with 4″ of brick backing.

Detail "A" shows a portion of the elevation at corner, to which the detail sections apply.

NOTE: The first floor level is shown only a little over 2 feet above grade allowing for three steps up to porches. The addition of another ashlar course at base would place first floor level about 3 feet 6 inches above grade which is a good average for buildings of this type, placing the porch or terrace floors 5 steps above grade with the first floor one step above porch.

The desirable importance is given to lower story by placing the belt course on a line with and continuous with second story window sills. This serves to accent the height of lower story where the ceiling height is moderate and only a little greater than ceiling height in second story.

A typical double hung sash window of good average size is shown in second story. Main double hung sash windows in lower story would be similar, excepting that these windows should occupy the height of five courses of ashlar less the height of a 5″ sill, and the minor or service windows 4 courses of ashlar less the height of a 5″ slip sill. A French casement is shown in lower story, the details of which will also serve for doors. Lug sills as indicated, should usually extend only 2″ beyond the face of jambs.

The bearing or distance that lintels extend into wall beyond face of jamb will often be regulated by the design as in this instance but should always be kept moderate. In plain Ashlar 3″ to 6″ is usually preferable to a greater bearing, with 4″ as the average and 8″ about the maximum bearing that should be used under ordinary circumstances.

Every third course of ashlar in lower story is a bond course, the belt course, cornice and one intermediate ashlar course serving as bond courses in second story. This is first class construction.

Details "M" and "N" show the bonding of corners with full 8″ thick headers in all courses. There is no economy in checking out the backs of these stones. If showing a 4″ head is considered satisfactory, then the corner stones in bond courses must be checked out as shown by Detail "L."

Detail "B" shows the section of door or French casement window sills, and detail "E" the section of sash window sill in second story. Detail sections "C," "D," "F" and "G" show the jamb and head or lintel sections.

Details "H," "J" and "K" show three different type alternate cornice sections with three types of gutter. Detail "H" shows section of the plain moulded cornice on elevation "A," with the metal covered box gutter set on top of stone corona member, forming a low cheneau. Detail "J" shows a very simple cornice treatment in which a hanging copper gutter is combined with a moulded cap course of stone to form cornice, a treatment that is thoroughly practical for residence work.

Detail "K" shows a box gutter treatment with a more elaborate dentil cornice but with the dentil course detailed, so that dentils can be cut with a saw, which costs less than cutting same entirely by hand.

DRAWING NO. 2—LIMESTONE TRIMMED BRICK RESIDENCE WALL

The plate on third page shows a series of typical details for the ordinary 12″ brick residence wall with Indiana Limestone trim. This might be all common brick or 4″ face brick with either 8″ common brick, or 8″ hollow tile backing.

Detail "A" shows a portion of the elevation at corner, to which the detail sections apply.

NOTE: The remarks in reference to plate Drawing No. 1, as to height above grade, storey heights and placing of belt course will also apply.

A low parapet wall is shown on top of cornice which could be changed to a Balustrade, or be omitted altogether, as parapet walls should usually be avoided. A simple balustrade of stone would be preferable, draining the top wash of cornice back to gutter inside of wall, as this will prevent any disfiguring wash from top of cornice over the face of building.

There are several methods of quoining at corners. Quoins of same size may be staggered in alternate courses, or be of uniform long and short depths on each side of corner in alternate courses. The staggering of quoins in alternate courses is shown by detail "L" and the other method using square and L shape blocks, sawed out of a square block as indicated by detail "N," which are placed in alternate courses, as shown by detail "M." Another method is to alternate courses of the 8″x8″ square section short quoins with 4″ thick long quoins having 4″ heads staggered on the two wall faces. It is generally best to make quoins of a height that will be equal to an odd number of brick courses as shown and for appearance the long quoin at corners should extend 8″ beyond the short or header quoin, rather than only 4″ which is sometimes done, as that also complicates the corner by requiring a deeper short quoin or header.

Details "B," "C," "D," "E" and "F" show typical sill, jamb and head sections.

Detail Section "H" shows the usual type of modillion cornice that is so often used with stone trimmed brick designs of this character but when detailed as at "H," separate hand cut sinkages or panels between the modillions are required. Detail "K" shows a plan through the modillion course, the modillions extending through full thickness of wall, with the fillers bedded 4″ on wall between same. Detail Section "J" shows a method of detailing modillion cornices that simplifies the cutting and reduces the cost.

Detail Section "J" shows moulded stone coping cut with wash and drip and Detail "J-1" shows a simplification using a plain bevel sawed coping with drips on both inside and outside of wall.

Detail "J" also shows the usual method of flashing in back of parapet wall at roof, but flashing the entire back of parapet is always preferable.

Detail Section "H" shows the newer, cheaper and more satisfactory way of flashing back of parapet wall, using a composition flashing instead of sheet metal flashing. This is a specially prepared product similar to composition roofing and is laid in an asphalt roofing cement and is bonded into the gravel, slag or other composition roofing and carried up entire back of parapet and under coping to within 2″ of the face of wall. It thus effectively prevents moisture from melting snow or other cause back of parapet, from passing through the wall.

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A. I. A. Classification No. 8 b 2

Indiana Limestone Service Publication
Series D4-5
Drawings 3 and 14

INDIANA LIMESTONE
The ARISTOCRAT of BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 2
November, 1921

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

ELEVATION AND DETAILS *for* INDIANA LIMESTONE FRONT FOR SMALL RESIDENCE, FLAT OR APARTMENT BUILDING

SHOWING THE SIMPLICITY OF WALL TREATMENT THAT IS POSSIBLE IN EFFECTIVELY DETAILING INDIANA LIMESTONE ASHLAR FACINGS FOR BUILDINGS OF THIS CHARACTER

THE use of Indiana Limestone for the facing of moderate cost City Residence buildings has not, in the past decade received the full consideration that it deserved simply because this material has been thought to be expensive or at least beyond the legitimate range of cost for buildings of this character.

This idea is in error and is based upon the fictitious ideas of cost that have prevailed on account of the extensive use of this Stone for richly detailed cut and carved work in the more elaborate monumental structures and its association in the professional mind, as well as the lay mind, with that type of building.

That a Stone facing will usually cost more than one of Brick must be admitted, but this difference frequently is not great and there should be other considerations which carry more weight in deciding this question. Immediate rental value and sale value are two of these, outward appearance and style, in addition to permanence, being the factors on which this very genuine rental value and permanent sale value are based.

The detailing of the Stone facing for moderate cost buildings of this character is of the greatest importance. The advantages of having the Stone detailed to fit the lay of the Brick was mentioned on Sheet No. 1. Refer to text on first page of that sheet. For all ordinary light masonry walls which are faced with Stone, such as two or three story residence walls, small flat and apartment building walls and walls for the ordinary commercial building, it is sufficient to make approximately every third course of Ashlar facing a bond course.

The details on this sheet show several schemes for carrying out the same general idea in design, one of which is based on using a standardized Ashlar height unit that will fit the lay of the Brick. The design was originally prepared without any regard for this feature and after the scheme had been worked out in the usual manner, an alternate scheme to fit the lay of the Brick was prepared to show how this can be done.

For buildings of this character, Ashlar courses that are either 11¼ or 16¼ inches in height are recommended for economical reasons, the 16¼ inch high course having the best appearance on account of its scale. This height, of course, is an excellent one to use because it is equivalent to six courses of Brick Backing or three courses of Standard Hollow Building Tile Backing, both laid up in the wall with the usual thickness of joints. For the same reason, the combination belt and sill course should be made either 5 inches or 8 inches in height to conform with two or three courses of Brick, preferably the former because it will also bond in with Hollow Tile.

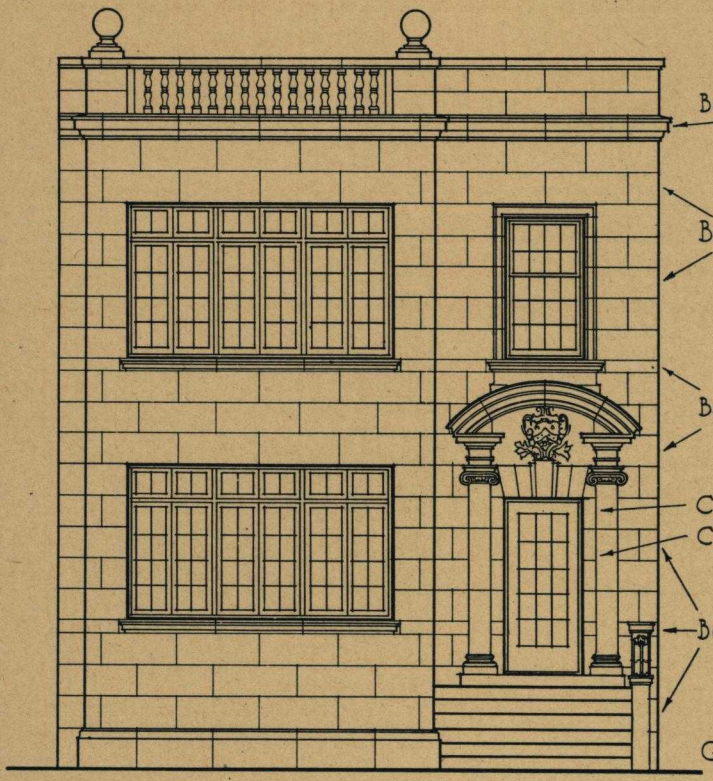
The 16¼ inch height of Ashlar course gives approximately the same ceiling height as the 14 inch course with one less course of Stone to the story height. The fact that the windows must be reduced when the 16¼ height of Ashlar is employed is not really a disadvantage, as the upper part of windows is very seldom used and the head of these windows, on account of transoms, placed rather high in schemes "A" and "B."

The rough sawed-four-side material, jointed on the job, can be used for the Ashlar facing for buildings of this character and the actual cut work be reduced to the grade course, steps, entrance feature with window trim above, window sills, cornice-belt, balustrade and parapet coping, thus enabling Limestone-faced flat or residence buildings of this general type to be executed at decidedly moderate cost.

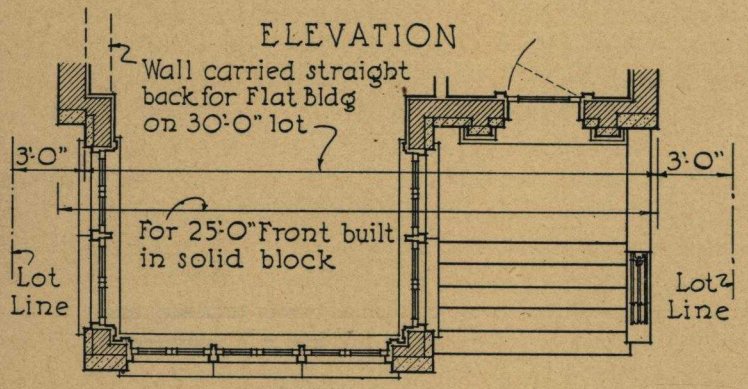
For further description and reference to the different detail sections shown on Plate Drawings Numbers 3 and 14 see last page

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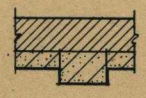
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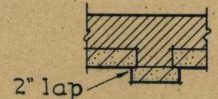
ELEVATION



PLAN

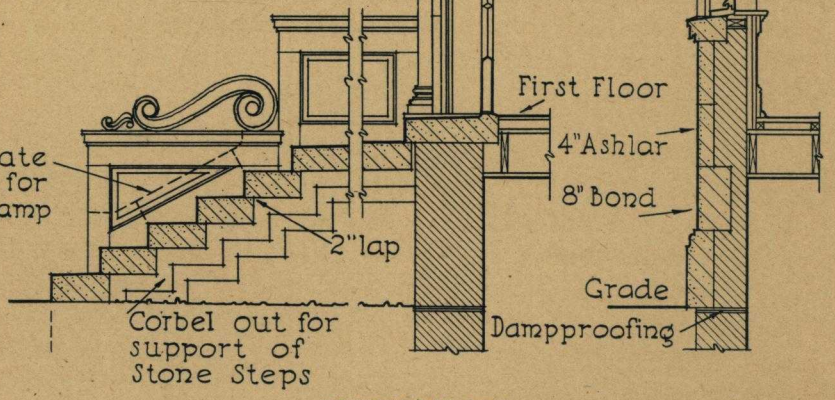


COURSE "A"



COURSE "B"

DETAILS OF PILASTER
(See Elevation)

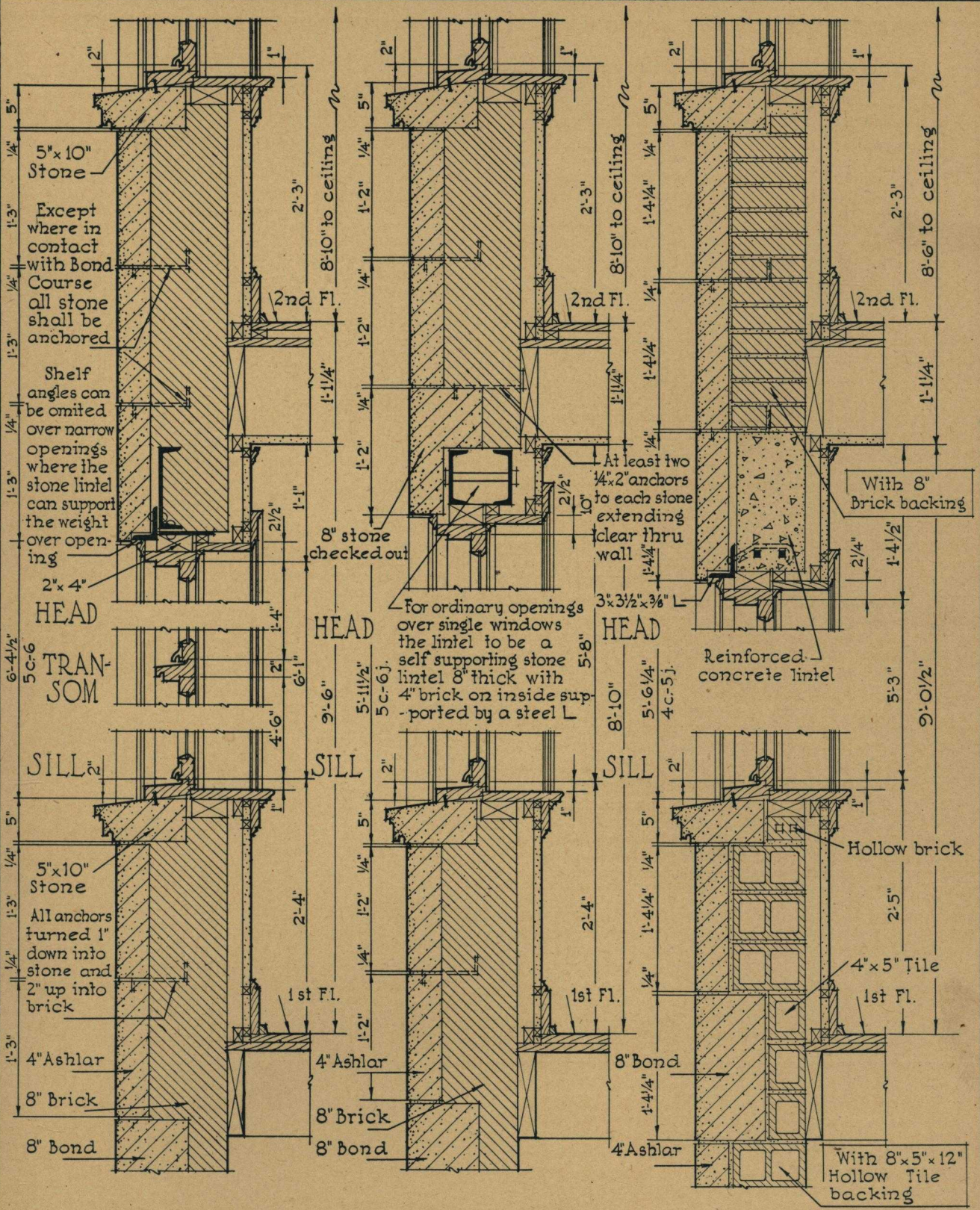


SECTION THRU ENTRANCE

SECTION THRU FRONT WALL

SCALE 0" 6" 1'-0" 1'-6" 2'-0" 2'-6" 3'-0" / 0' 1' 2' 3' 4' 5' 6'	TYPICAL DETAILS OF INDIANA LIMESTONE FRONT FOR SMALL HOUSE OR APARTMENT BUILDING	DRAWING NO. 3
DATE - APRIL 15, 1921		SERIES - D 5 - 3

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SECTION "A" WALL OF 1'-3" ASHLAR

SECTION "B" WALL OF 1'-2" ASHLAR

SECTION "C" WALL OF 1'-4¼" ASHLAR

SCALE 0" 3" 6" 9" 12" DATE NOV. 28TH 1921	ALTERNATE WALL SECTIONS FOR INDIANA LIMESTONE RESIDENCE FRONT	DRAWING NO 14 SERIES - D4 - 14

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DRAWING No. 3—ELEVATION, PLAN AND WALL SECTIONS

The elevation on this plate indicates a type of front that is so frequently met with in the outlying built-up sections of the larger cities. This front, as indicated on the plan, is for a 25-foot front built solid in the block. If party walls were permissible, the front would be the same, but the width of interior of building increased approximately one foot. For a detached residence or flat building on a 30-foot lot, the wall at left side of bay would be carried straight back as indicated, making the width of building 24 feet, with a 3-foot allowance for the yard or alley space on both sides.

The first story level is shown at about 4'-1" or seven 7" risers above grade, based upon six steps up to entrance platform and one at entrance doorsill.

The section through entrance indicates the detailing of the stone facing and the greater depth of projecting courses; also the manner in which the load from wall above door and second story window in back of stone work is supported by steel angle lintel. Entrance feature could be greatly simplified, the columns with curved pediment and cartouch panel being omitted and the wall left entirely plain or this feature be replaced by a simple moulded architrave around doorway.

The ornamental side wall at steps with console feature could also be omitted and be replaced by a simple ramp as indicated by dotted line showing alternate scheme for ramp at side of steps, greatly reducing cost of this feature.

The section through front wall shows two alternate methods of constructing lintels for the support of walls over wide openings. In the lower story, a reinforced concrete lintel with shelf angle fastened to the face of same for the support of stone is shown and in the upper story, a built-up steel lintel composed of channel, angle and plate is indicated.

The method of dowelling parapet balusters into base and cap course is indicated. Those balusters which occur under joints in coping could to better advantage be cut with a square key on the head of same and the rail be fitted over this by cutting a "V"-shaped offset in the under side.

The method of bonding pilasters in alternate course is indicated. In the better class of work, to avoid showing a vertical joint at side of pilasters, the middle course "A" should be checked an inch or two in depth for Ashlar, so that the Ashlar courses will also pass an inch or so in back of pilaster course "A."

An alternate method of flashing would be to carry the composition roofing up the face of wall to under side of cornice course, and underneath this course to within two inches of the face of wall, dispensing altogether with metal cap flashing, which is usually very unsatisfactory, as melting snow in back of parapet will usually find some way of getting up under the cap flashing and into the wall. Whereas the composition flashing is laid continuous with the roofing.

DRAWING No. 14—TYPICAL WALL SECTIONS FOR THE THREE ASHLAR FACING SCHEMES

The plate on page three shows enlarged sections of the wall through window openings for the three Ashlar schemes referred to on page one.

Section "A" shows the scheme as originally planned for rather high ceilings, based on the use of eight 15" high Ashlar courses and one 5" high sill course to the story height, giving a 9'-6" ceiling in lower story and an 8'-10" ceiling in second story, with sills placed 2'-3" above floors and rough openings for windows 6'-4½" in height in both stories. This will permit the use of 4'-6" high casement sash and 1'-4" transom sash.

Section "B" shows the same scheme with ceilings reduced in height by using eight 14" high Ashlar courses with the one 5" sill course to story height. This gives 8'-10" ceilings in both stories, which is a quite usual and economical height for this type of residence building. The sills in this scheme are also placed 2'-3" above floors and the rough openings 5'-11½" high in both stories, permitting the use of 4'-3" high casement sash and 1'-2" transom sash.

Joists, 10" deep, are shown in both schemes. If joist were reduced to 9" or 8" it would add either 1" or 2" to the story heights and to the height of sills above floor, or the use of 11" or 12" joist would similarly reduce both of these measurements.

Section "C" shows the adaption of this design for use with a 16¼" height of Ashlar course, which can be backed up and bonded with either brick or hollow tile without cutting, as this height is equivalent to either 6 courses of brick or 3 courses of building tile with the usual thickness of joints.

In this scheme only seven of the wide 16¼" courses are used to the story height, with the one 5" sill course, giving an 9'-0" ceiling in lower story and an 8'-6" ceiling in second story, with sill placed 1" higher in lower story and rough window openings reduced to 5'-6¼" in height, which will permit the use of 3'-10" high casement sash and 1'-2" transom sash. This is really ample height for windows of this type, under most circumstances. In fact, the lesser height of lower sash seems to be an advantage because it is not practical to use roller shades with casement windows and for that reason, a rather high window is undesirable.

Under ordinary conditions, it is thought that scheme "C" would be preferable. This is the simplest and cheapest of the three to build, on account of the manner in which the facing and backing can be bonded with little or no cutting and fitting. The 16¼" height of Ashlar course has the further advantage that it can be produced without waste in the sawing up of the rough quarry blocks and it is, therefore, one of the best widths to use for moderate cost work.

Alternate schemes for three types of lintels are clearly indicated by these Details.

NOTE: By adding another Ashlar course under cornice-belt, permitting the raising of roof line, the ceiling height in second story schemes A and C could be made the same as in first story. If the building was to be a two-family house or a flat building, this would generally be advisable. The added course could be made a part of the cornice-belt treatment and could be made only about 8" in height, if it was desired to hold down the height of front wall.

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A. I. A. Classification No. 8 b 2

Indiana Limestone Service Publication
Series D5
Drawings 4 and 5

INDIANA LIMESTONE
The ARISTOCRAT *of* BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 3
May, 1922

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT ***of the***
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

TYPICAL DETAILS FOR INDIANA LIMESTONE FACED BEARING WALLS *for* TWO TYPES OF BANK BUILDINGS

SHOWING THE APPLICATION OF LIMESTONE FACING, THE JOINTING, ANCHORAGE AND BOND TO BRICK BACKING, ETC.

IN the preparation of these details, no attempt has been made to illustrate a particular type of design that is considered especially appropriate for Bank Buildings but only to show the proper detailing of the stone work and wall relationships for two very generally used types of Bank building design. The one shown by Drawing No. 4, a very simple treatment of plain wall surmounted by cornice and parapet, as appropriate for a small Bank and the other, as shown by Drawing No. 5, a somewhat larger Bank with a Pilaster treatment of the facade.

On both plates the elevation has been shown as a front only, with a narrow section of blank wall flush with building line at both sides to receive the return of cornice and other moulding, altho it is assumed that either design would apply more particularly to a corner building and a somewhat similar treatment of stone facing be carried along the side elevation; in which case the narrow section of blank wall at that corner would be omitted, and the side elevation join the front on line of corner which returns onto this blank wall.

While parapet walls have been shown as being general with this type of building design and required by many City Building ordinances, parapet walls are not to be recommended where they can be avoided. The low type of parapet shown on the larger building *Drawing No. 5* with flashing carried up the entire back of same and underneath the coping being the preferable, as it effectively prevents moisture from melting snow in back of parapet to enter wall. With the usual type of parapet as shown by *Drawing No. 4* care should be exercised in laying of Brick backing to see that all joints are thoroughly filled with good mortar and the **back of entire parapet between top of flashing and underside of Stone coping be thoroughly coated with a heavy application of asphaltic Damp-proof paint, or a standard foundation water-proofing compound.**

This detail, frequently overlooked, is important in preventing moisture from entering back of parapet, causing the stone work in this part of the building to have a darker appearance and often causing staining or efflorescence.

Sometimes it is just as economical to build a light parapet of moderate height entirely of stone, especially where a part of it is a balustrade, as in this instance. This form of construction, for several reasons, will always be more satisfactory than a stone facing with Brick Backing.

The damp course at grade line is also an important feature and should not be overlooked.

The Indiana Limestone throughout, it will be noted, has been cut to fit the lay of the Brick; all stone which extends back of facing proper being made 4 inches deeper and 8 inches deeper where necessary in cornices.

The walls are shown about as light as would generally be permissable, or desirable for these types of buildings.

Assuming that the Bank front might be built adjoining a vacant lot or in center of open block, the detail at "C" *Drawing No. 4* and at "A" *Drawing No. 5* shows method of returning stone facing on blank brick wall to give a better looking and more substantial effect.

The windows in front have purposely been kept small to conform with the types of design illustrated, assuming that proper light would be obtained at side and rear, or from skylights in roof.

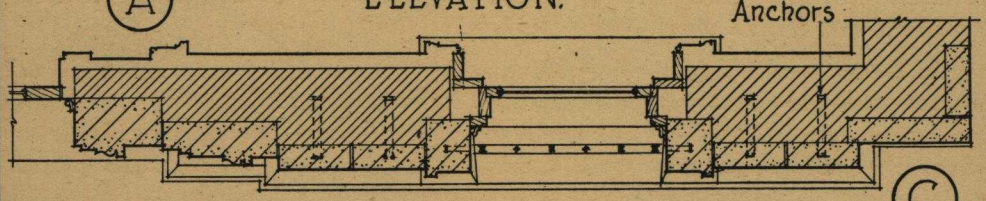
For further description and reference to the different detail sections shown on plate drawing No. 4 and 5, see last page.

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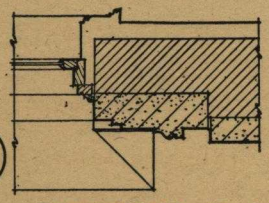
INDIANA LIMESTONE



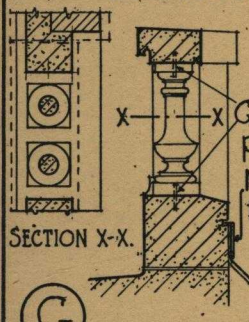
A ELEVATION.



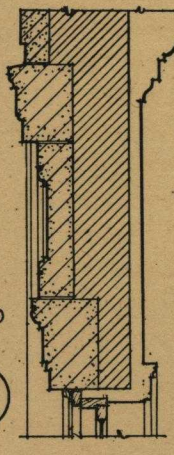
½ PLAN - SECTION C-C.



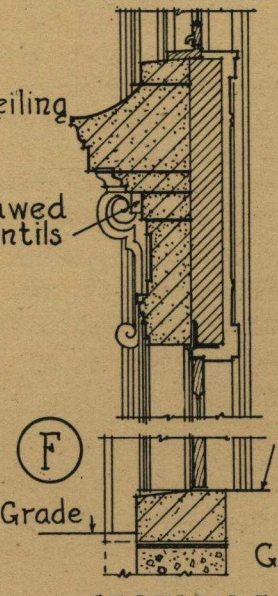
D SECTION D-D.



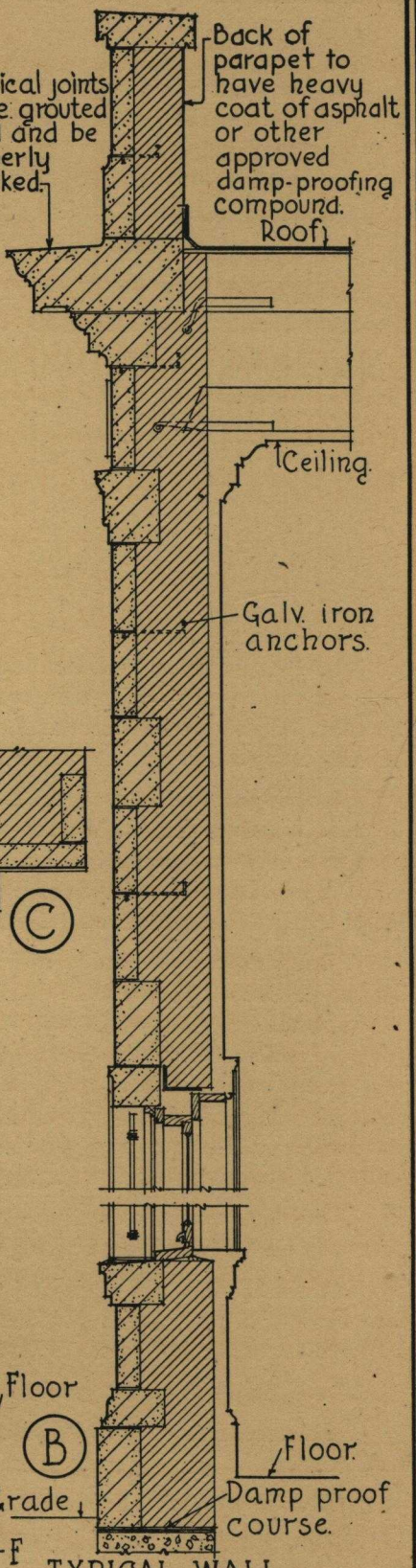
G BALUSTER DETAIL.



E SECTION E-E.



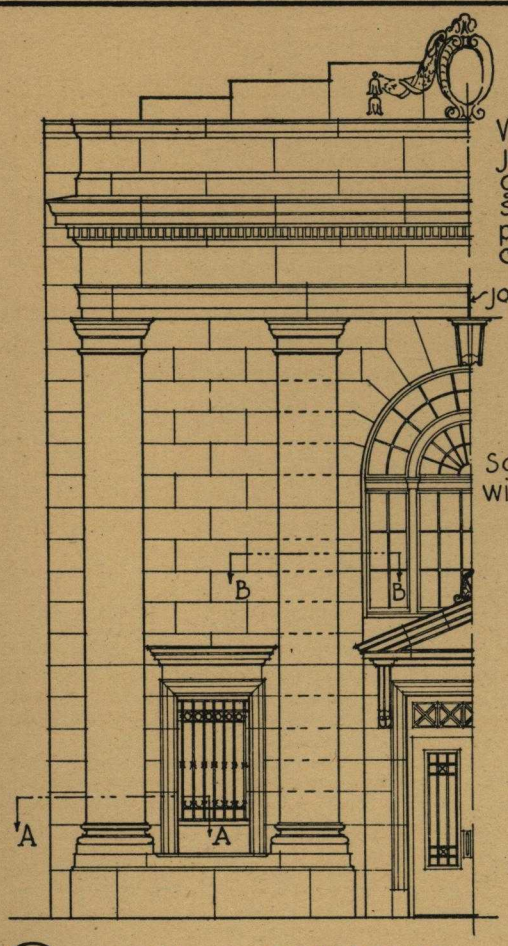
F SECTION F-F



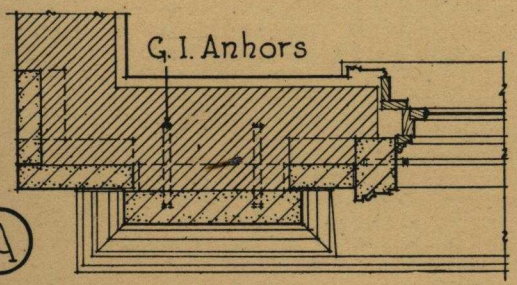
B TYPICAL WALL SECTION.

SCALE 0 6" 12" 18" 24" DATE - APRIL 15, 1922.	TYPICAL DETAILS FOR SMALL BANK BUILDING FACED WITH INDIANA LIMESTONE	DRAWING NO. 4 SERIES - D 5 - 4

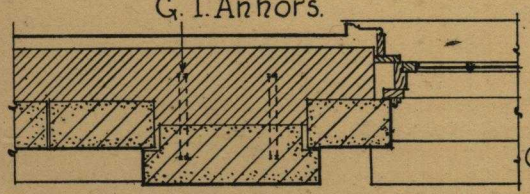
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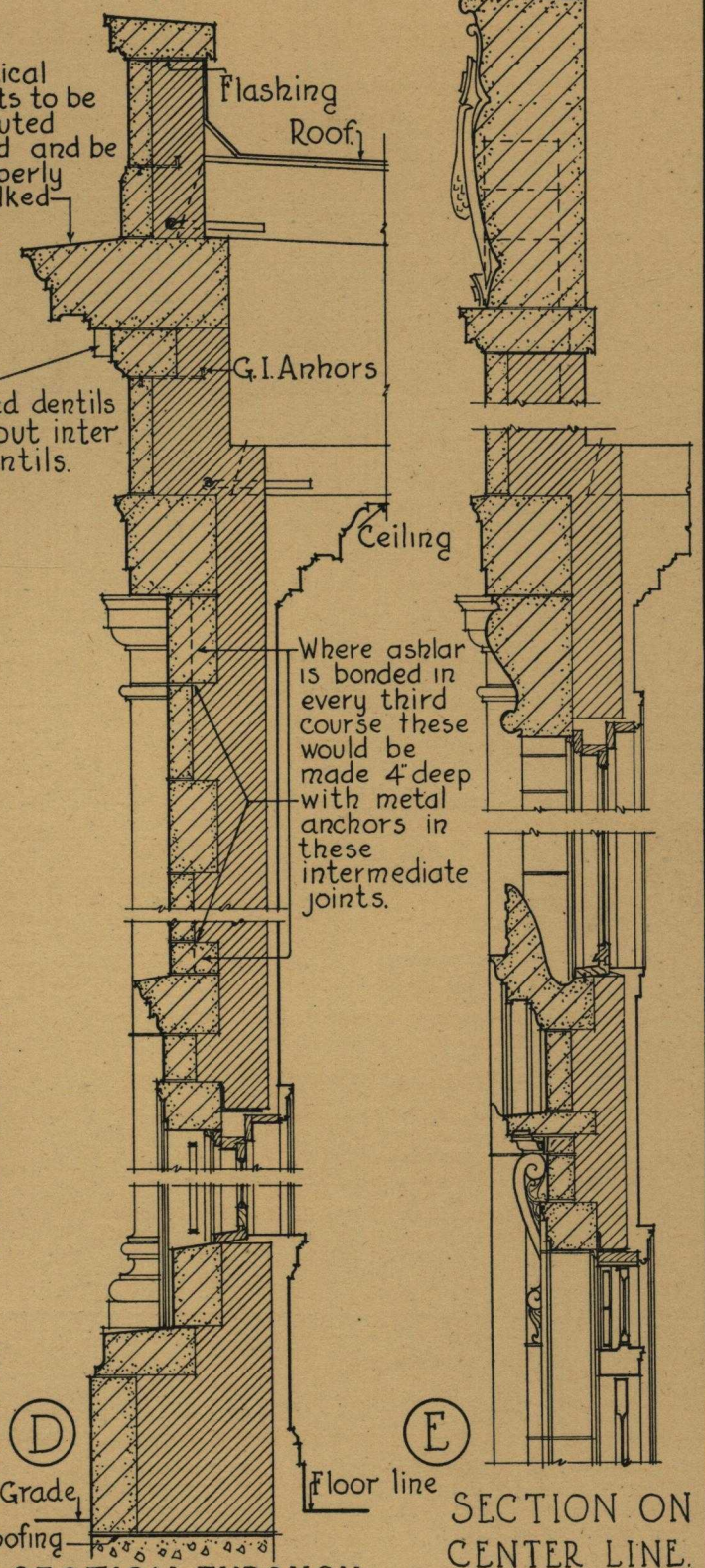
(C) ½ ELEVATION.



(A) PLAN SECTION A-A.



(B) PLAN SECTION B.-B



(D) SECTION THROUGH WALL & WINDOW BETWEEN PILASTERS.

(E) SECTION ON CENTER LINE.

SCALE 0" 6" 12" 18" 24" DATE - APRIL 15, 1922	TYPICAL DETAILS FOR BANK FACED WITH INDIANA LIMESTONE SHOWING PILASTER TREATMENT	DRAWING NO. 5 SERIES - D5 - 5

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DRAWING No. 4
SMALL BANK FRONT OF PLAIN ASHLAR

The Plate on second page shows a series of Details for 16-inch thick wall consisting of a 4-inch Indiana Limestone Ashlar Facing with 12-inch backing of common Brick work, all bond and jamb stone, etc., having an 8-inch bed on the wall.

The elevation "A" indicates a treatment which, if continued on side elevation, would consist of a series of plain square-headed window openings without architrave and with piers of plain Ashlar between same. Both these openings and the piers between would, of course, be made narrower than the entrance feature and piers on front elevation, the Stone architrave member of entablature being cut in a single piece over windows, to serve as a structural lintel spanning these windows.

The inset Balustrade continues the focal interest of front, without destroying the solidity of effect of the piers flanking central entrance motive.

Detail at "B" shows a typical section of wall, showing the bond of facing by making every third course of Ashlar a bond course and by metal anchors in the intermediate joint.

The cornice is of a plain moulded section, including sinkage for drip running the entire length.

The Vertical joints in top of cornice should be carefully grouted ***and be caulked with lead wool or other suitable material, so as to be water tight. This also applies to parapet coping.***

Unless the roof pitches away from front wall, it would ordinarily be better to carry the flashing somewhat higher on back of parapet wall, excepting in back of Balustrade.

There is a raised panel in center of frieze to provide for incised letter inscription or to provide for the cutting of raised letters, if preferred.

Detail at "C" shows a plan section through the wall at door and window openings and indicates the return of facing on side wall, if exposed at corner.

Detail at "D" shows a section through the Archivolt and frame of window over entrance.

Detail at "E" shows section through the sunk spandrel panel filling the space between arch and entablature above.

Detail at "F" is vertical section through the entrance door.

Detail at "G" shows a section through balustrade indicating the break in thickness of parapet and in coping to form balustrade cap. The Balustrade base, it will be noted, is kept full width to avoid an awkward return in flashing on roof.

The jointing of Ashlar, is a trifle small in scale for stone work generally, but has been kept fine in order to carry out the scale of the design. *This applies to both designs.*

DRAWING No. 5
BANK FRONT WITH PILASTER TREATMENT

The Plate on third page shows a series of Details for 16-inch thick wall of a larger building than Bank shown by Drawing No. 4 and with a projecting pilaster treatment, surmounted by a somewhat heavier entablature. This scheme is for a more monumental type of design and the Ashlar is shown bonded in every alternate course, although it would be quite satisfactory to bond this Ashlar in every third course, *the same as that shown by Drawing No. 4,* when permitted by Building Code.

The half elevation "C" illustrates a number of important points in the detailing of Cut Stone. The corner pilaster is shown in three sections and the other Pilaster with dotted lines indicating the jointing of same to conform with Ashlar courses. The three section pilaster shaft is considered to have a more satisfactory appearance and to be the best for most purposes. The jointing of architrave member of entablature over pilasters and over key stone of central arch is considered proper. The jointing of water-table sill under column bases should be noted, also the jointing of central feature and cartouch surmounting parapet. It will be noted from detail section "E" that this work on top of parapet coping is built of SOLID STONE.

Detail at "A" is a section of corner Pilaster showing the Ashlar carried in back of same and detail at "B" a section of the other Pilaster, taken through bond course of Ashlar and central *or bond* section of pilaster shaft, showing the manner in which the deeper section of pilaster is checked out to permit ashlar facing to pass in back of same, thus avoiding the exposed vertical joint that would exist, if Ashlar were butted to side of pilaster section.

Detail at "D" shows the vertical section through wall and window, between pilasters. The indicated sawed dentil course of cornice, is one that is the most economical to produce. It is, of course, important, in the bedding of main cornice member, to have this member properly bedded on wall with a full mortar joint so as to avoid any improper bearing on top of these dentils. It will be noted that roof has been placed fairly high above ceiling so that flashing can be carried up parapet and under coping. This is intended to be a composition flashing made integral with the roof, a type of flashing that is now manufactured by the leading producers of roofing materials and generally preferable to a metal flashing, where the detail can be made like that illustrated on this drawing.

Detail at "E" shows section through door, window and cartouch feature in the center of building. The substantial support of the entablature architrave, where jointed in center over key stone of arch, is clearly indicated. The gutter formed in back of the peak of pediment over doorway, where this extends up in front of window, should be noted. This should be pitched a little to both sides in order to carry off the wash from window-sill.

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Indiana Limestone Service Publication
Series D4
Drawings 6 and 7

INDIANA LIMESTONE
The ARISTOCRAT *of* BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 4
May, 1921

Prepared and Published by **ARCHITECTS' SERVICE DEPARTMENT *of the***
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

TYPICAL DETAILS FOR ENCLOSURE WALLS BUILT OF INDIANA LIMESTONE ASHLAR *with* HOLLOW TILE BACKING

SHOWING NINE COURSES OF STONE TO AN AVERAGE 11'-0" STORY HEIGHT, BONDED INTO AND BACKED UP WITH BOTH STANDARD SIDE AND END CONSTRUCTION HOLLOW TILE

For Walls of

SKELETON FRAME BUILDINGS

IN the preparation of these details no attempt was made to select any particular height of course that would work out best with the backing-up units. A more or less standard average story height for commercial buildings of 11'0" floor to floor was taken, giving a clear ceiling height of 9'8" to 10'2" according to depth of floor construction used. With that assumption fixed, an average moderate height of Stone course was assumed and the problem worked out on the basis of 9 courses of Stone to a story, using only standard Hollow Tile shapes for the backing-up units.

As these details are primarily details for the enclosure walls of skeleton frame buildings, a structural steel frame fire-proofed with Hollow Tile and with standard flat arch floor construction has been shown but these details are equally adaptable for steel frame structures with reinforced concrete or tile and concrete long-span floor construction and concrete fire-proofing, or for an all reinforced concrete structure.

The only important point that requires special attention where the details are to be used in connection with a reinforced concrete structure or concrete fire-proofing of structural steel frame, is to so detail the structural frame that there will be ample clearance between the face of concrete and back of Stone work. An inch joint is the minimum back joint that should be allowed as this will seldom average over ¾" in the finished building on account of the irregularities, warping and swelling of wood forms and an even wider allowance for back joint is often advisable.

It is customary to allow at least 1½" of concrete fire-proofing over the outer edge of beam flanges. Many Building Codes require 2" or more of fire-proofing on steel Spandrel beams and Girders and the center line of Spandrel beams should be located with that in mind plus the above noted allowance for joint in back of Stone. The plates or angles used for the support of wall, unless otherwise restricted by the local building code, may extend out to within 2" of the face of wall.

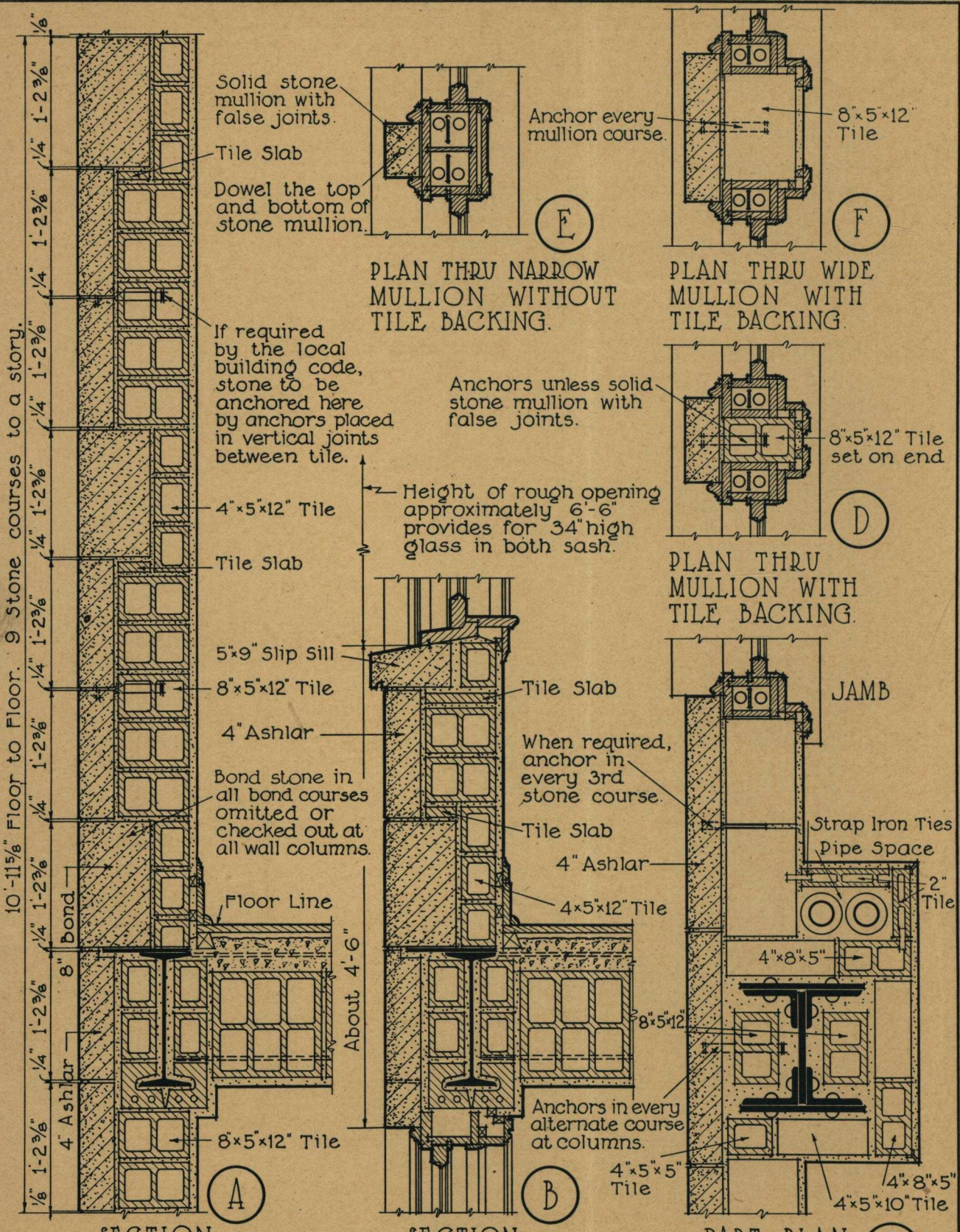
It is customary to allow at least 2" of concrete over the extreme edge of metal for the fire-proofing of steel columns; again many Building Codes require a greater thickness and Center-line of Columns in relation to face of wall and should be located with this in mind. Where the ordinary Plate and Angle Columns are to be set with the edge of flanges out towards face of wall, the thickness of fire-proofing plus a full one-inch joint may constitute a sufficient allowance between outer edge of steel and back of stone. Where the face of flange is turned out towards face of wall, this is not sufficient on account of connection plates, rivet heads, etc. and at least 4" should be allowed between normal face of typical steel column and back of Stone where 2" of fire-proofing is required, as the fire-proofing must average 3" in thickness on this face of column to properly cover and protect the steel. An ample allowance to provide for irregularities is advisable.

Another important point to remember is that all surfaces of Concrete to which Indiana Limestone facing is to be applied, including also those faces of Concrete against which Brick or Tile backing in direct contact with the Stone is to be set, must be thoroughly coated with an approved Water-proofing Compound. This should always be applied to the Concrete, never to the back of Stone (*See ASSOCIATION STANDARD SPECIFICATION FOR CUT STONE*).

For further description and reference to the different detail sections shown on Plate Drawings Nos. 6 and 7 see last page.

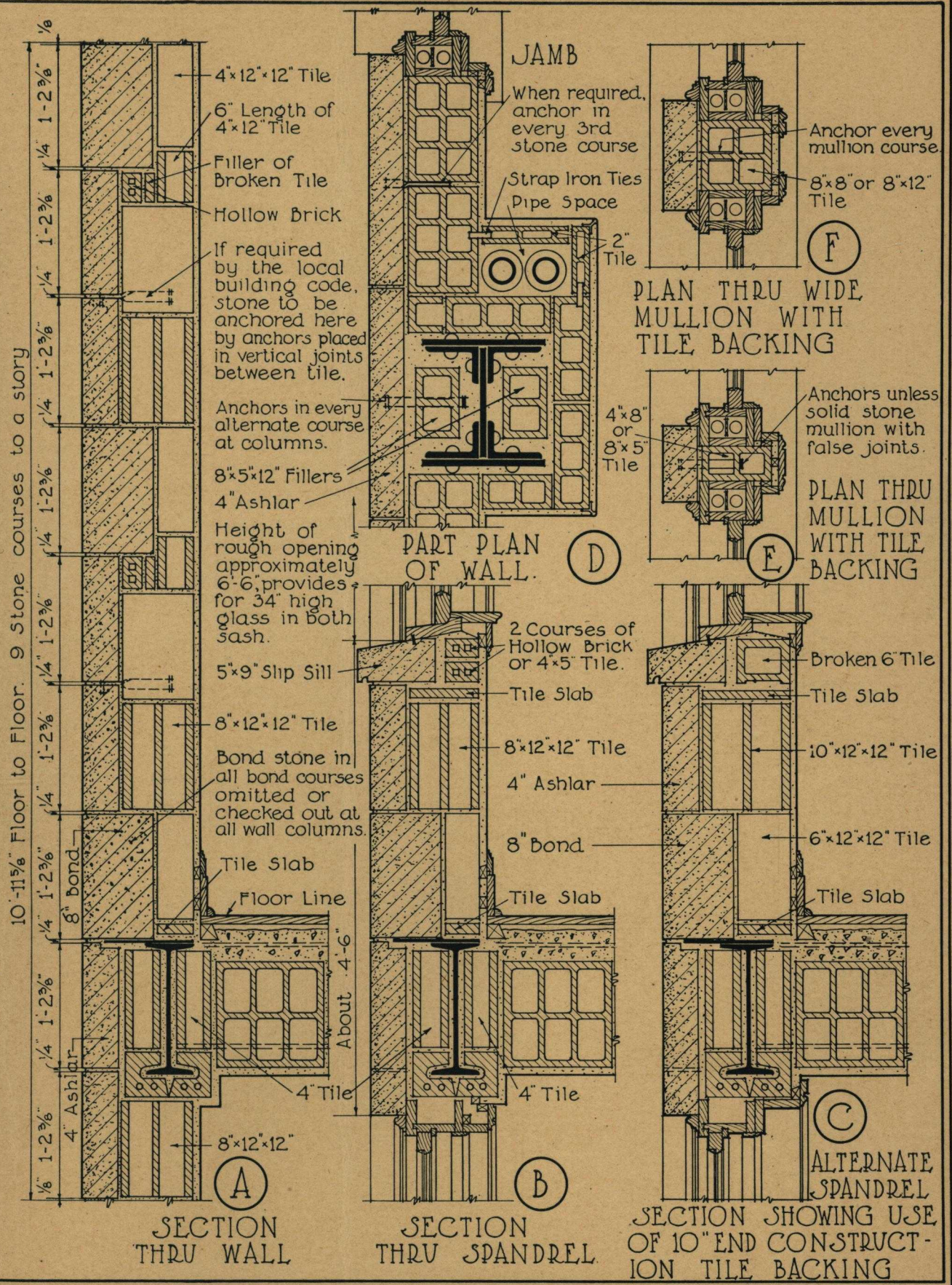
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INDIANA LIMESTONE



SCALE 0 3" 6" 9" 12" DATE-MARCH 28TH 1921	DETAILS FOR ENCLOSURE WALL OF INDIANA LIMESTONE ASHLAR WITH HOLLOW TILE BACKING.	DRAWING NO. 6. SERIES - D 4 - 1.

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SCALE 0 3 6 9 12 DATE-MARCH 28TH 1921	DETAILS FOR ENCLOSURE WALL OF INDIANA LIMESTONE ASHLAR WITH HOLLOW TILE BACKING.	DRAWING NO. 7. SERIES - D4 - 2

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DRAWING NO. 6—SIDE CONSTRUCTION TILE BACKING

The Plate on second page shows the details of wall with backing of the commonly used 8x5x12" Building Tile with 4x5x12" tile at back of bond courses and with the fire-proof enclosure of wall columns built of Hollow Tile units of these same sections.

Detail Section "A" shows a typical section through the straight wall without window openings, showing three bond courses to a story height. There is no necessity for bonding the facing to backing in every alternate course in enclosure walls, as is sometimes required for load-bearing masonry walls; in fact where the courses are high, one bond course to a story height is considered entirely sufficient and the number here shown is decidedly conservative practice. The Building Codes of a large number of large cities permit the use of a Limestone Facing carried on steel angles without any bond to backing other than by the metal anchors that are used to securely tie the facing to the backing.

Detail Section "C" shows the sectional plan of wall at typical structural steel wall column and the method of bonding the tile backing around Columns to form fire-proof column enclosure with provision for pipe space on either side (or both sides) of column which should always be kept outside of and separate from the fire-proofing of columns. The channel spaces in columns should always be solidly filled with Concrete or broken tile and cement mortar or with Hollow Tile fillers and mortar as shown. Where brick backing is used channel spaces should be filled in solidly with Brickwork.

Note—To avoid danger of staining the limestone, P. C. concrete filling of columns should not be used; excepting where the entire fire-proof encasing of column is of concrete that is to be poured as a separate operation into form work and completed before the walls are carried up so that the surfaces of concrete to which the Indiana Limestone Facing and immediate backing up of same are to be applied may be coated with water-proof compound before walls are carried up.

Where the Column is of reinforced concrete or of steel encased in concrete the tile enclosure of column would be omitted and the backing be built up against concrete in which case brick ties or bond wire should be built into and left to project from concrete at proper intervals and later be built into the backing of enclosure walls to securely tie these walls to structural frame.

Detail of Spandrel Section "B" shows the typical relationship of window sill and head, to floor and ceiling, fixing the height of rough opening for window frames for this particular scheme at 6'6". This provides for 34" high glass in both upper and lower sash.

Details "D", "E" and "F" show plan sections through various types of mullion. Detail "F" showing a typical wide mullion which may be increased in width to form piers between windows of any width desired. Detail "E" for one piece Stone mullion without backing may be used with any form of wall backing.

DRAWING NO. 7—END CONSTRUCTION TILE BACKING

The Plate on third page shows the details of wall with backing of the so-called Standard "load-bearing" 8x12x12" end construction Hollow Tile with 4x12x12" and 4x12x6" tile at bond courses and with the fire-proof enclosure of wall columns built 4x12x12" load-bearing partition or column covering tile, as the ordinary thin shell partition tile is not generally permitted for column fire-proofing.

Detail Section "A" shows a typical section through the straight wall without window openings also with three bond courses to a story height. The remarks on bond courses in opposite paragraph referring to side construction backing also apply to end construction backing. Hollow brick and tile slabs or broken tile are used to level up backing under bond courses and to provide a solid bed on which the setting mortar can be properly spread for bedding of Stone.

Detail Section "D" shows the sectional plan of wall at typical steel column and the method of bonding the tile backing around columns to form fire-proof column enclosure. The further remarks in opposite paragraph regarding filling of channel spaces; pipe spaces and for bonding to other types of column also apply to end construction backing. 8x5x12" Building Tile are shown as fillers in the channel spaces of columns on both drawings because Portland Cement Concrete should never be poured against Limestone on account of the staining and discoloration of Stone that may result from action of concrete in direct contact with same and the elimination of concrete filling is very desirable in connection with this form of construction; *see Note in opposite paragraph in reference to this.*

Detail of Spandrel Section "B" shows the typical relationship of window sill and head, to floor and ceiling, fixing the height of rough openings and height of glass same as for side construction tile backing.

Detail Section "C" is an alternate of Spandrel Section "B" showing the effects of increasing the thickness of wall two inches by using 10 and 6 inch thick tile; instead of 8 and 4 inch tile, as shown in Detail Sections "A", "B" and plan Section "D". This is often advisable in order to provide a wall of sufficient thickness to eliminate any projection of beam over window heads and keep the face of fireproofing of beams occurring in wall flush with inner face of wall.

A 10 inch thick backing may also be used where a 3 inch facing of Stone is permitted for enclosure walls but where the total thickness of wall must not be less than 13 inch.

Details "E" and "F" show typical mullion plan sections. Detail "F" (like similar detail on drawing No. 6) may be increased in width to form piers between windows of any width desired.

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A. I. A. Classification No.

Indiana Limestone Service Publication
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Drawings 8 and 9

INDIANA LIMESTONE
The ARISTOCRAT *of* BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 5
May, 1921

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

TYPICAL DETAILS FOR ENCLOSURE WALLS BUILT OF INDIANA LIMESTONE ASHLAR *with* HOLLOW TILE BACKING

SHOWING FIVE COURSES OF STONE TO AN AVERAGE 11'-0" STORY HEIGHT, BONDED INTO AND BACKED UP WITH BOTH STANDARD SIDE AND END CONSTRUCTION HOLLOW TILE

For Walls of

SKELETON FRAME BUILDINGS

THE details on this sheet are similar to those shown on sheet No. 4, but constitute an alternate scheme for designs employing larger units and fewer courses to a story. A similar average story height for commercial buildings of 11'0" floor to floor was taken and with that assumption fixed, the problem worked out on basis of only five courses of Stone to a story, again using only standard Hollow Tile shapes for the backing up units.

This gives Ashlar courses about 26" in height and is more in keeping with the idea of Stone construction, as expressed in some of the best modern work of leading Architects, using Indiana Limestone as a facing for enclosure walls of skeleton frame structures. Prominent Architects, both in the east and west, have used Indiana Limestone Ashlar Facing courses 2'0 and over in height and one well-known mid-western Architect has used courses around 4'0 in height for the facing of a very large office building and courses 6'0 in height for a fine bank building, all with very excellent effect.

It is a great mistake to cut up an ashlar facing, whether smooth face, tooled face or rusticated, into too small units. Many architectural drafstmen and even designers have erred in this respect merely because they have not had the benefit of training in detailing, in an office accustomed to handling Stone construction and they will often make the units too small on account of being more accustomed to working with other materials which cannot be produced in large sizes.

A design must be cut up into small units when Architectural Terra Cotta is used on account of the manufacturing limitations which govern and make necessary a treatment, either in line with a Mosaic or in which the eye will be detracted from the multiplicity of joints, by breaking up the surface with elaborate detail.

Such designs can readily be executed in Indiana Limestone, where this effect is desired; in fact any elaborate treatment that can be executed in a plastic material, even the finest low relief plaster work, can also be executed in Indiana Limestone but these over ornate designs are not generally advisable because of the added useless expense, the loss of scale and character and the somewhat restless and generally less satisfactory effect.

Broad plain or tooled surfaces and comparatively long moulded members with joints placed in their proper relation in the different architectural features, are usually to be preferred as they are more in keeping with dignified stone construction and serve as a better foundation or background for well placed sculptured detail.

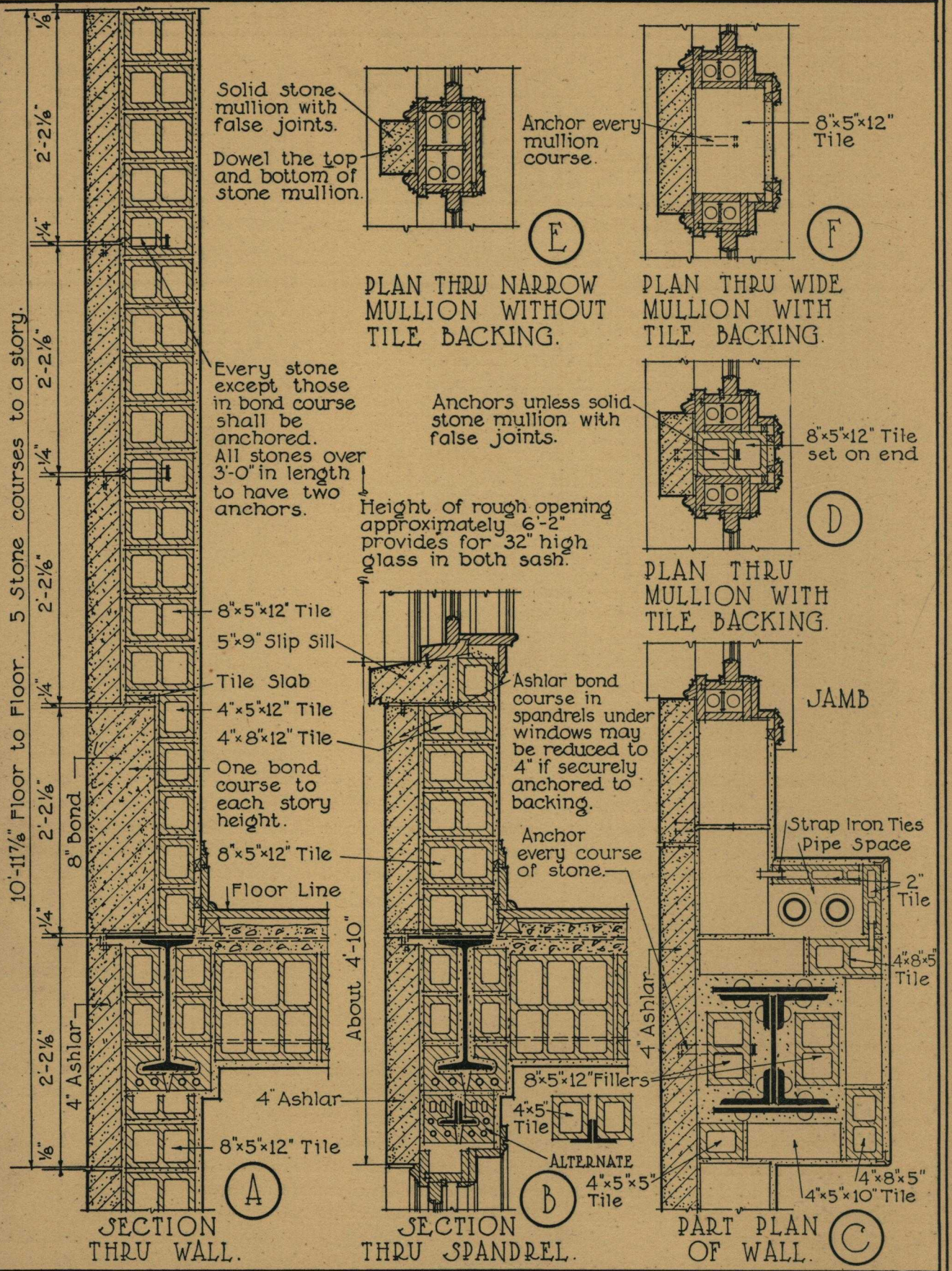
These details like the details on Sheet No. 4 are primarily details for the enclosure walls of skeleton frame buildings. A structural steel frame, fire-proofed with Hollow Tile and with standard flat arch floor construction has been shown but they are equally adaptable for steel frame structures with reinforced concrete, or tile and concrete long-span floor construction and concrete fire-proofing, or for an all reinforced concrete structure.

When Concrete construction or fire-proofing is used, it is important that ample allowance for back joint be provided and that the surfaces of concrete be coated with water-proofing compound. For further information on these points, see Text on first page of Details and Data Sheet No. 4.

For further description and reference to the different detail sections shown on Plate Drawings Nos. 8 and 9 see last page.

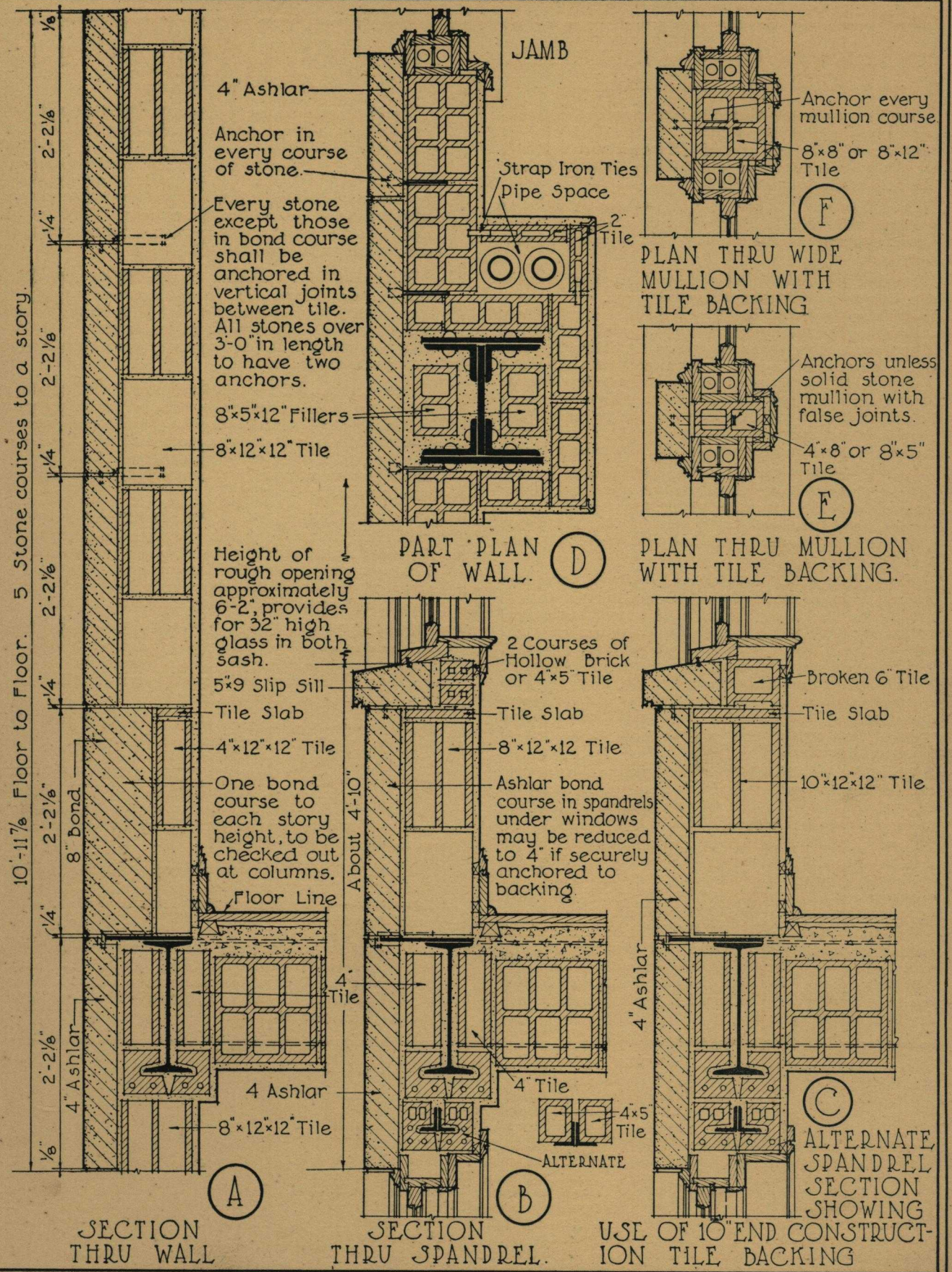
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SCALE 0" 3" 6" 9" 12" DATE-MARCH 28TH 1921.	DETAILS FOR ENCLOSURE WALL OF INDIANA LIMESTONE ASHLAR WITH HOLLOW TILE BACKING.	DRAWING NO. 8. SERIES - D 4. - 3.

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SCALE 0 3 6 9 12 DATE-MARCH 28TH 1921.	DETAILS FOR ENCLOSURE WALL OF INDIANA LIMESTONE ASHLAR WITH HOLLOW TILE BACKING.	DRAWING NO. 9. SERIES - D4. - 4.

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DRAWING NO. 8—SIDE CONSTRUCTION TILE BACKING

The Plate on second page shows the details of wall with backing of the commonly used 8″ x 5″ x 12″ Building Tile with 4″ x 5″ x 12″ tile at back of bond courses and with the fire-proof enclosure of wall columns built of Hollow Tile units of these same sections.

Detail Section "A" shows a typical section through the straight wall without window openings, showing the Stone facing supported on the steel by a bond course at each story level.

The Building Codes of many large cities permit the use of a Limestone Facing carried on steel angles without any bond to backing other than by the metal anchors that are used to securely tie the facing to the backing but the method of supporting same with a bond course as shown by these details is considered better construction. One bond course to a story height is entirely sufficient, particularly where the bond courses are high and constitute such a reasonable proportion of the surface area of a story height of wall. As the sills extend back into wall it is considered unnecessary to carry the bond course through spandrels under windows.

There is no necessity for bonding the facing to backing in every alternate course in enclosure walls, as is sometimes required for load-bearing walls, in fact, even in load-bearing masonry walls for all ordinary purposes, making every third course a bond course is sufficient and considered good practice.

Detail Section "C" shows the sectional plan of wall at typical structural steel wall column and the method of bonding the tile backing around Columns to form fire-proof column enclosure with provision for pipe space on either side (or both sides) of column. Pipe space should always be kept outside of and separate from the fire-proofing of columns and the channel spaces be solidly filled, *see notes on Sheet No. 4, in reference to this and in regard to the importance of keeping the concrete from contact with Stone to prevent staining.* Bond courses must be checked out to thickness of facing at all columns.

Where the column is of reinforced concrete or of steel encased in concrete, the tile enclosure of column would be omitted and the backing be built up against concrete, *see further reference to this on Sheet No. 4.*

Detail of Spandrel Section "B" shows the typical relationship of window sill and head to floor and ceiling, fixing the height of rough opening for window frames for this particular scheme at 6′2″. This provides for 32″ high glass in both upper and lower sash.

Details "D," "E" and "F" show plan sections through various types of mullion. Detail "E" showing a typical wide mullion which may be increased in width to form piers between windows of any width desired. Detail "E" showing one piece Stone mullion without backing may be used with any form of wall backing.

DRAWING NO. 9—END CONSTRUCTION TILE BACKING

The Plate on third page shows the details of wall with backing of the so-called Standard "load-bearing" 8″x 12″ x 12″ end construction Hollow Tile with 4″ x 12″ x 12″ tile at Bond courses and with the fire-proof enclosure of wall columns built of 4″ x 12″ x 12″ load-bearing partition or column covering tile, as the ordinary thin shell partition tile is not generally permitted for column fire-proofing. Tile slabs are used to level up at Bond courses and to close up cells in tile and provide proper bed under sills.

Detail Section "A" shows a typical section through the straight wall without window openings also showing the Stone Facing supported on the steel by a bond course at each story level. The remarks on bond courses in opposite paragraph referring to side construction backing also apply to end construction backing.

Detail Section "D" shows the sectional plan of wall at typical steel column and the method of bonding the tile backing around Columns to form fire-proof Column enclosure. The remarks in opposite paragraph *and on Sheet No. 4* regarding filling of channel spaces, pipe spaces and for bonding to other types of column also apply to end construction backing.

8″x5″x12″ Building Tile are shown as fillers in the channel spaces of columns on both drawings because Portland Cement Concrete should never be poured against Indiana Limestone on account of the staining and discoloration of the Stone that may result from action of Concrete in direct contact with same. *See further reference to this on Sheet No. 4.*

Detail of Spandrel Section "B" shows the typical relationship of window sill and head to floor and ceiling fixing the height of rough opening for window frames and height of glass, exactly the same as for side construction tile backing with five courses of stone to a story.

Detail Section "C" is an alternate of spandrel section "B" showing the effect of increasing the thickness of wall two inches by using 10″ and 6″ thick tile instead of 8″ and 4″ tile as shown by other details "A," "B" and plan section "D." This, *for the reasons noted on Sheet No. 4,* is often advisable but can only be accomplished where end construction tile is used. With side construction tile, an increase of 4″ is necessary, same as with Brick.

Detail "E" and "F" show plan section of typical mullions. Detail "F" (like similar detail on drawing No. 8) may be increased in width to form piers between windows of any width desired.

It is further recommended that Architects and Builders consult the new STANDARD SPECIFICATIONS of this Association for additional information regarding the detailing of INDIANA LIMESTONE, and its application to modern building construction.

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Indiana Limestone Service Publication

Series D4

Drawings 10 and 11

INDIANA LIMESTONE

The ARISTOCRAT *of* BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 6

July, 1921

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT ***of the***

INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

TYPICAL DETAILS FOR LOAD-BEARING WALLS BUILT OF INDIANA LIMESTONE BONDED INTO HOLLOW TILE

SHOWING AN ECONOMICAL FORM OF CONSTRUCTION SPECIALLY SUITED FOR RESIDENCES, APARTMENT AND FLAT BUILDINGS, AND OTHER LIGHT WALLS *of* LOAD-BEARING MASONRY

THE details on this sheet are intended principally for use in those localities where the building codes do not provide for the use of a stone ashlar facing as a part of the thickness of light, load-bearing walls, unless bonded into the backing in exactly similar manner to that prescribed for the bonding of face brick. Also in those localities where the code makes no provision for stone facing but where brick-faced hollow tile construction is permitted.

The Indiana Limestone facing, therefore, is arranged in alternate wide and narrow courses, the wide courses having a height equal to four or five courses of brick, *according to whether bond at every fifth or sixth course of brick is required,* and the alternate narrow courses, equal to one course of brick, bonding the facing into backing with these alternate thin header courses of stone, which make metal anchors unnecessary. This construction provides a very strong masonry wall that is suitable for use with either wood joists or fireproof floor construction, and which cannot be objected to, regardless of the deficiencies or antiquated requirements of any particular building code.

With this form of construction a particular type of hollow tile backing is used, consisting of end construction tile alternated with the so-called "header-backer" tile in back of each bond course.

The height of story shown was arbitrarily adopted because this is the minimum height requirement and *consequently the regular floor to floor dimension* for flat and tenement buildings in certain cities, and because it is a good average height for buildings of this character. An 8′ or 8′ 6″ ceiling height is often ample for the small private residence and two-family flat building, but is not sufficient for the larger flat and apartment or tenement buildings, which are often lighted partly from narrow courts.

The placing of window heads higher up into the wall and closer to the ceiling, as in commercial buildings, is sometimes recommended, but it is really useless to do this, as the housewife must be reckoned with and she will not utilize the upper portion of window, especially when it is placed very high. The use of shades and over-curtains always prevents this portion of window from serving any good purpose.

It is, therefore, no advantage to make the windows greater than normal height, and for convenience the sill must be placed at a certain level.

The height of sill for this type of building will often be regulated by the height of the lower sizes of standard radiators, and it will thus be fixed at about 27″ or 29″ above finished floor. Based upon these factors the details for double hung windows indicate 30″ glass in both sash, which is a good average size for this height of ceiling.

It will be noted that not only is the section of wall indicated but that relationships between floors and window sills and heads have been carefully worked out for both wood joist and fireproof floor construction.

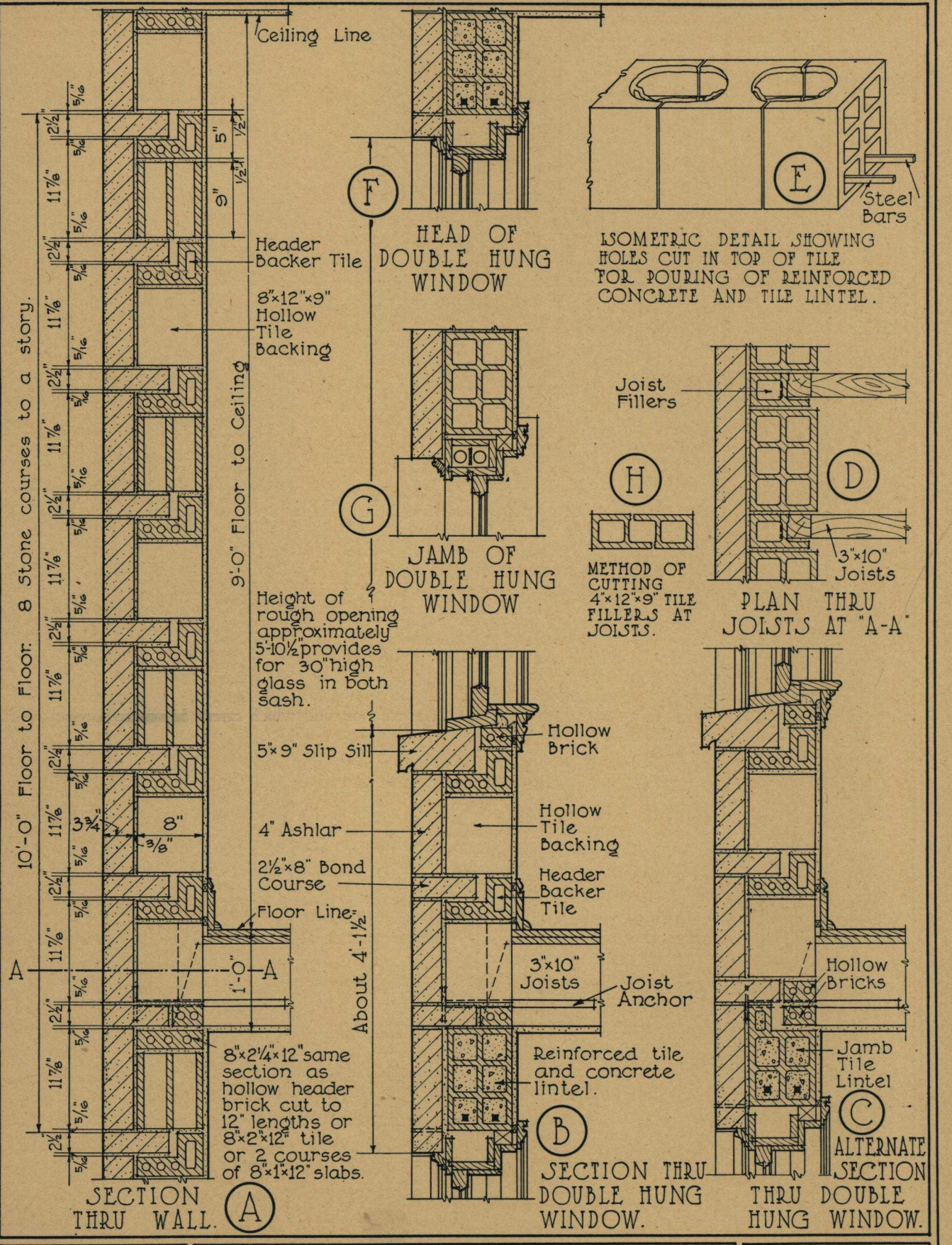
Where fireproof floors of reinforced concrete or long-span fireproof floors of concrete and hollow tile are used with wall-bearing construction of this character, it is necessary to pour the concrete for floor construction after the walls have been built up to each story height, but concrete should never be poured against the stone facing, nor the stone facing be applied direct to face of concrete. Every precaution should be taken to prevent this contact; there should always be a course of tile set in non-staining mortar between concrete and back of stone as indicated and all outer faces of concrete, or of tile in direct contact with same, should be coated with an approved asphaltic damp-proof preparation, **always coating the concrete or tile, never the back of the stone,** and all limestone should be set in either lime mortar or a mortar composed of non-staining cement or a mixture of non-staining cement and lime.

This form of construction also involves the protection of stone facing from any wash or slopping over of concrete and unless the facing is so protected, some staining of the stone work may result.

For further description and reference to the different detail sections shown on Plate Drawings Numbers 10 and 11 see last page.

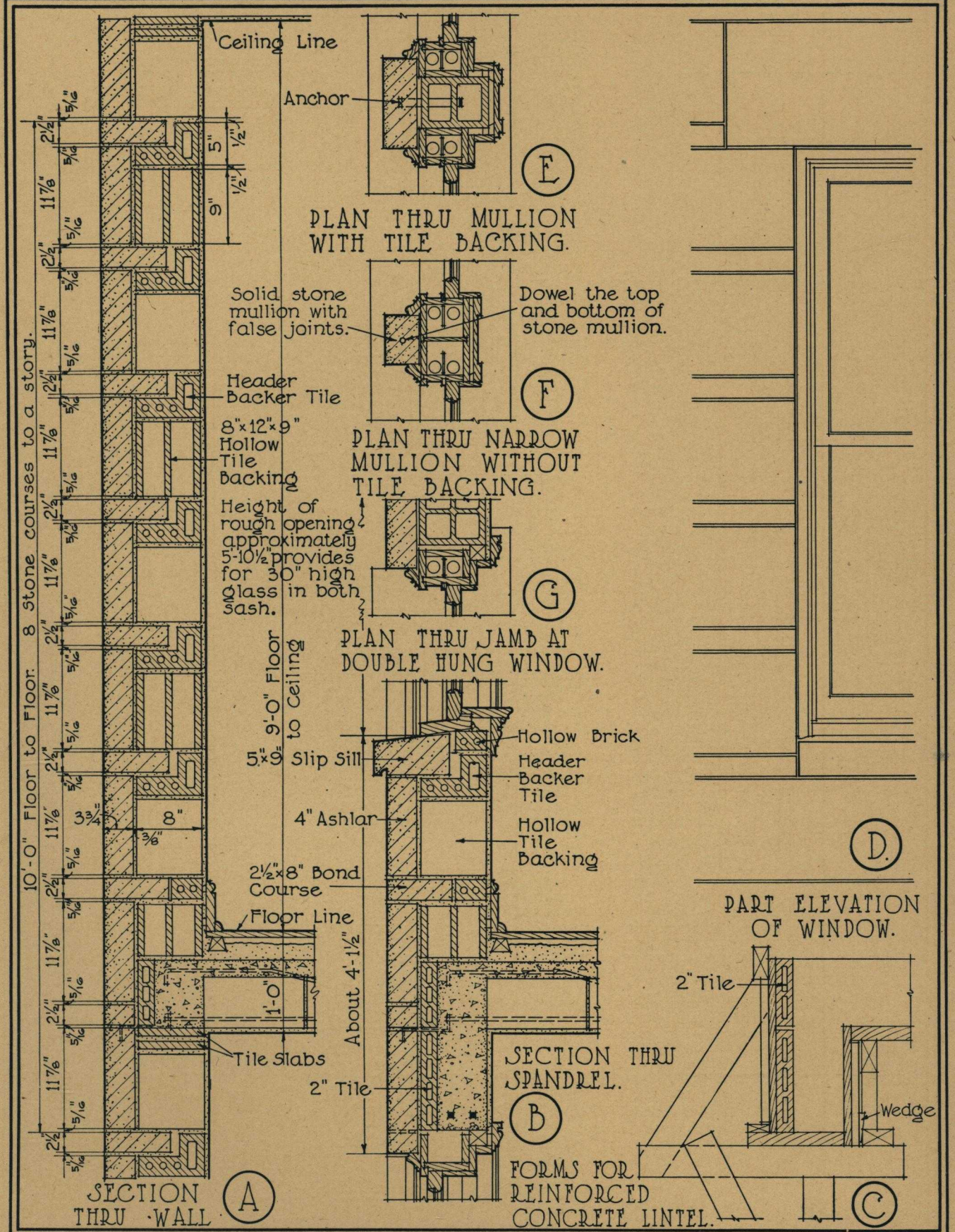
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INDIANA LIMESTONE



SCALE 0" 3" 6" 9" 12"	LOAD BEARING WALL OF INDIANA LIMESTONE ASHLAR AND HOLLOW TILE WITH WOOD FLOOR CONSTRUCTION	DRAWING NO. 10
DATE - APRIL 15, 1921		SERIES - D 4 - 10

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SCALE 0" 3" 6" 9" 12" DATE- APRIL 15, 1921.	LOAD BEARING WALL OF INDIANA LIMESTONE ASHLAR AND HOLLOW TILE WITH LONG SPAN FIREPROOF FLOOR	DRAWING NO. 11. SERIES - D 4 - 11

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DRAWING NO. 10—WOOD JOIST FLOOR CONSTRUCTION

The Plate on second page shows the details for this form of wall construction as described on first page, with wood joist floor construction. The stone units employed are 4-inch ashlar slabs (*actually a full 3¾ inches thick*) sawed to a scant 12-inch width and 2½-inch slabs sawed to 8-inch width. The stone sawed four sides in this manner can either be cut to length at the stone yard or mill to a previously arranged setting diagram ready for erection in the building, or be delivered to site in strips of random length and be jointed up to sizes required on the job.

The hollow tile units employed are the standard 8″x12″ load-bearing end construction tile cut to 9-inch lengths alternated with the special "header-backer" tile which is manufactured for the bonding of face brick to hollow tile backing. Also a few hollow header and stretcher brick for working up to bearing, etc., at floor levels.

Detail Section "A" shows typical section through the straight wall without window openings, showing clearly the method of bonding stone facing in each alternate course and the arrangement of joist bearing. Detail "D" shows plan section through joist at line A-A, and Detail "H" the method of cutting 4-inch tile to form fillers and joist pockets.

Detail Section "B" shows a section through spandrel and relation of floor construction to the sill and head of standard double hung window, placing the sill approximately 2′3″ above floor with 10-inch joist and permitting the use of 26″ high radiators under windows.

Detail Section "C" shows another section through spandrel. This is an alternate to Section "B," making no change in the outside of spandrel but dropping the joint 2″ lower in order to permit the use of 28″ high radiators or to provide for 12″ deep joist.

Detail "G" shows the jamb section and detail section "F" the head of double hung windows, the latter indicating the usual reinforced hollow tile lintel for the support of wall and floor construction over openings.

The method of constructing these lintels is clearly shown by detail "E." A portion of the top and inner webs of the tile are broken away at joints between tile to permit the filling of tile after it has been set in place, with a rich concrete, steel reinforcing rods of the size required being placed in the two lower cells. The building of reinforced lintels on the wall in this manner is much preferable to the previous building-up and filling of same, requiring the use of derrick or gin pole to lift them into place on the wall.

DRAWING NO. 11—LONG-SPAN FIREPROOF FLOOR CONSTRUCTION

The Plate on third page shows the details for similar wall construction with the usual long-span floor construction, consisting of hollow tile between reinforced concrete joist or tee beams.

Detail Section "A" shows typical section through the straight wall without window openings and shows the tile fillers in floor construction stopped at the inside face of wall and the concrete forming a continuous tie-beam and bearing member on the walls. Note also that the concrete is kept back 2½″ from the back face of stone work and this space filled in with 2-inch hollow tile. There are two ways to accomplish this, one is to set the outer form for concrete in 2½″ and then set the tile in place later, first coating the outer face of concrete with the damp-proofing compound and then setting the tile in lime mortar; the other is to set the tile in lime mortar against the previously erected outer wood form and then coat the inner face of this tile and the bearing slab as well, with a damp-proofing compound before the concrete is poured against same.

Detail Section "B" shows the manner in which the concrete tie-beam above referred to is carried down to greater depth and reinforced to form lintel over window or other openings in wall.

Detail "C" shows the method of constructing forms for these lintels, the tile being set in lime mortar in a form and concrete then poured against same. It is very important in all forms of construction where concrete must be poured after the wall work, including limestone facing, has been erected, to see that the work is carried on so as to prevent moisture from concrete coming in contact with the stone, as this is liable to cause some staining or discoloration of the stone.

It will be noted that the height of spandrel and relationship of window sill and head to floor construction, shown by Detail "B" on this drawing, are the same as indicated for wood joist construction by Detail "B" on Drawing No. 10.

Detail "D" shows the part elevation of double hung window which would be the same with either wood joint or fireproof floor construction. A slip sill is indicated because this is the cheapest form of sill, but lug sill could be used by checking out the stone facing, in which case the lug should extend only 2 inches beyond the face of jamb.

A stone lintel is shown with an 8-inch bearing on the wall. This is about the greatest depth of bearing that should be used. In most instances it would be preferable to extend the lintel only 4 or 5 inches beyond the face of jamb for bearing.

Detail "F" shows a section of solid stone mullion for the facing of window box where the windows are arranged in pairs with a single frame or in threes with single frame having a wide window in center and a narrow window on each side. These mullions should be properly seated and dowelled into sill and lintel.

Detail "E" shows section through an ordinary stone mullion with tile backing, which by using different widths of tile can be made any width required.

For narrow widths these mullions can best be made in a single piece dowelled into sill and lintel and false jointed if desired, but for widths greater than 12 inches can be laid up in courses the same as balance of wall facing, the bond stone courses being checked out at back to fit around window box.

The most convenient widths for mullions constructed in this manner would be to make the stone facing either 12 or 14 inches wide, using 6 or 8 inch wide tile backing and having some of the "header-backer" tile furnished in 6- or 8-inch lengths for this purpose. Similarly, narrow piers between windows should be made 18 inches, 24½ inches, 31 inches or 37½ inches, etc., in width so as to utilize multiples of tile and half tile in the backing and thus avoid all unnecessary cutting of the backing.

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A. I. A. Classification No. 8 b 2

Indiana Limestone Service Publication
Series D4
Drawings 12 and 13

INDIANA LIMESTONE
The ARISTOCRAT *of* BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 7
July, 1921

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

TYPICAL DETAILS FOR LOAD-BEARING *and* ENCLOSURE WALLS *built of* INDIANA LIMESTONE *and* HOLLOW TILE

SHOWING CERTAIN DETAILS THAT ARE SUPPLEMENTARY TO THOSE SHOWN BY DRAWINGS NOS. 10 AND 11, SHEET NO. 6, AND ILLUSTRATING FURTHER THE USE OF LIMESTONE FACING BONDED INTO HOLLOW TILE WITH HEADER STONES

THE details on this sheet are based on the use of a particular type of Hollow Tile backing, consisting of load-bearing end construction tile cut to 9″ length with the so-called "Header-Backer" tile at bond courses. Like the details on sheet No. 6, these are intended principally for use in those localities where it is necessary to bond the stone facing into backing in exactly similar manner to that prescribed for the bonding of face brick, in order to conform with the local building code requirements and permit the facing to be figured as a part of the thickness of wall for load-bearing purposes.

Since this form of construction restricts the exterior treatment to alternate wide and narrow courses, neither of which are of as great a height as are generally used and considered best for stone construction, and further requires a greater number or frequency of bond courses than ordinarily would be used, although little, if any, greater amount of stone bonded back into wall than with wider and less frequently spaced bond courses, these details are prepared and recommended only to overcome in a reasonable, sound and legitimate way the antiquated and in some instances obviously unfair code provisions that still prevail in some localities.

This form of construction without question results in a very thoroughly bonded and substantial light masonry wall that is adaptable to use for numerous types of moderate cost commercial and residence buildings, including warehouses and other types of structure, where a large expanse of either light load-bearing or enclosure walls of a substantial type are required.

A variation of the scheme shown by this sheet and sheet No. 6 would be to make the bond course 5½″ in height and use two of the special shape tile in back of each bond course, the upper one reversed. Still another variation with the bond courses 5½″ in height that could be used where the building code requirements were more reasonable would be to make the alternate stone courses between bond courses about 15″ wide, using the 8″ x 12″ tile in regular 12″ length for backing, or to make the alternate stone courses about 27¼″ wide, using two courses of 12″ tile in back of same. This latter scheme would have units of a scale that would be more in keeping with a large building.

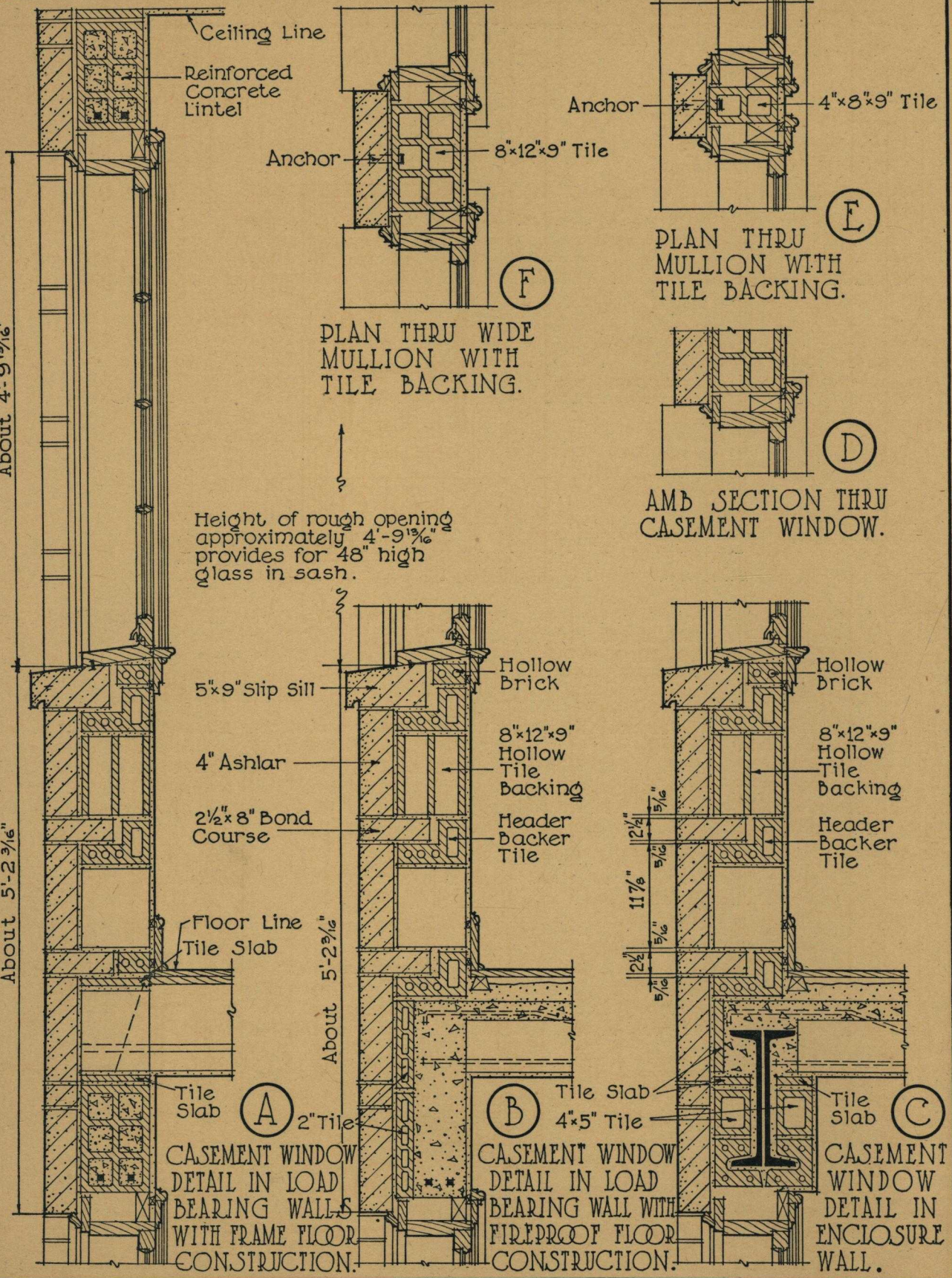
While these details have been prepared for cut stone, this form of Indiana Limestone facing can be built of the rough, sawed-four-side, quarry-run material and, therefore, affords a very economical form of construction for speculative flat and apartment buildings where something more pleasing than a plain common brick and more handsome and permanent than a stucco-finished tile wall is desired. Handled in that way, this form of construction in most localities will cost little more than the usual brick wall with stone sills and other simple trim.

Still another variation, using the rough, sawed-four-side, quarry-run material, the stone bond courses either 2½″ or 5½″ in height, would be to have the material for these bond courses furnished in strips a little more than double the depth of bed required, or say 17″ to 18″ wide, splitting these strips in half on the job and pitching off the broken edge to a suitable rock face, which, in setting, would be turned out to face of wall for added textural effect.

The finished face of wall would then consist of the wide bands of rough sawed face stone, alternated with the narrow rock face bands. The rock could be either pronounced, moderate, or very slight *almost flat* and simply a natural variation of the split and sawed surfaces, which provides an interesting variety of textural effects that can be obtained in walls of this form of construction.

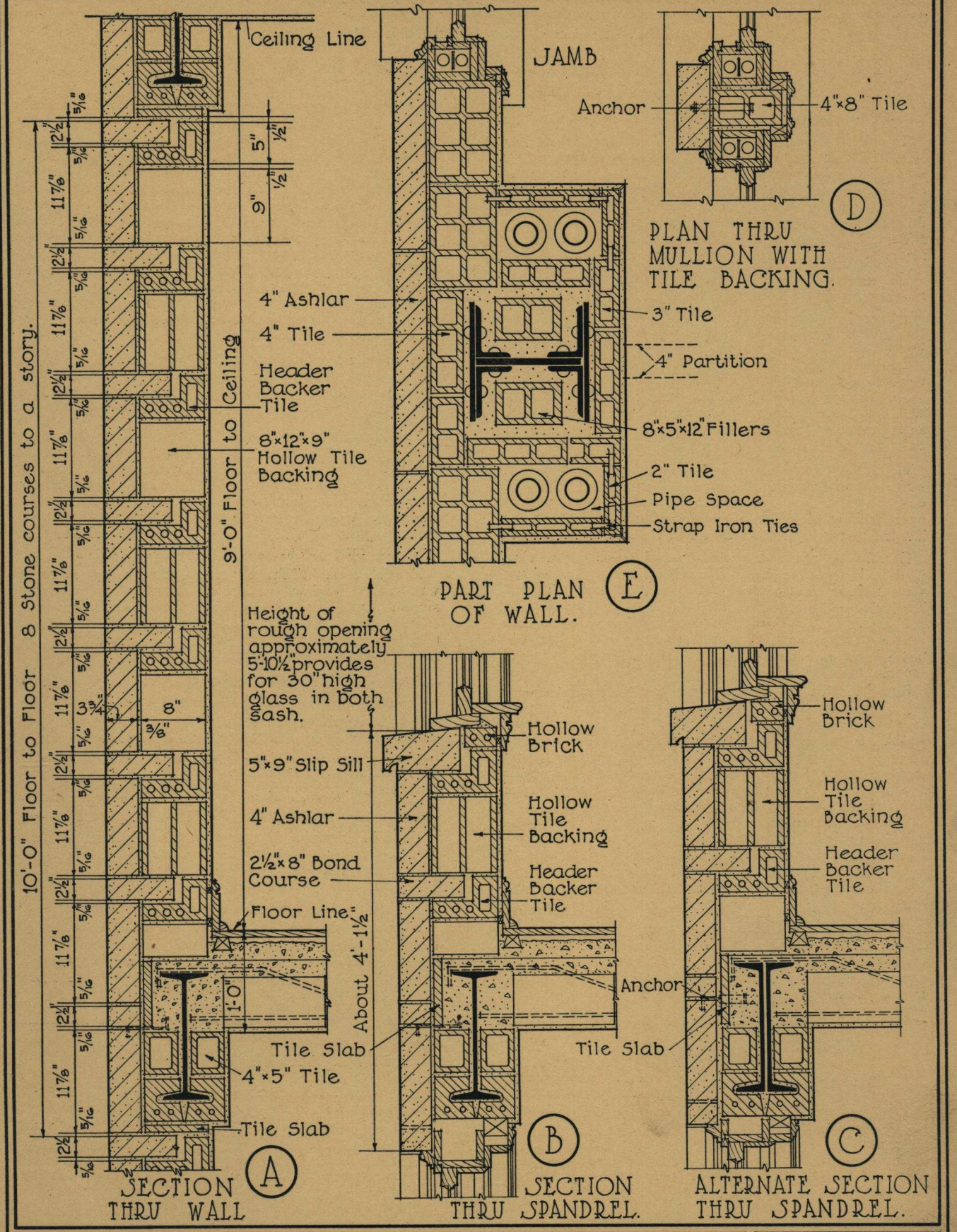
For further description and reference to the different detail sections shown on Plate Drawings Nos. 12 and 13 see last page

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SCALE 0" 3" 6" 9" 12" DATE - APRIL 15, 1921	LOAD BEARING AND ENCLOSURE WALLS OF INDIANA LIMESTONE AND HOLLOW TILE. SUPPLEMENTARY TO DRAWINGS NO. 10, 11, AND 13.	DRAWING NO. 12 SERIES - D 4 - 12

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SCALE 0 3" 6" 9" 12" DATE APRIL 15, 1921	ENCLOSURE WALLS OF INDIANA LIMESTONE ASHLAR WITH HOLLOW TILE BACKING FOR SKELETON FRAME BUILDINGS.	DRAWING NO. 13 SERIES - D 4 - 13

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The details on Plate Drawings Nos. 10 and 11, Sheet No. 6, should be studied along with the details on this sheet

DRAWING NO. 12—CASEMENT WINDOWS WITH VARIOUS TYPES OF FLOOR CONSTRUCTION

The plate on second page supplements plate drawings Nos. 10 and 11 by showing casement windows in load-bearing walls with both wood joist and fireproof floor construction; also supplements plate drawing No. 13 by showing casement window in connection with enclosure walls of skeleton frame building. All relationships between floor and window sill and heads of these windows have been carefully worked out for both wood joist and fireproof floor construction.

The sill for casement window has been placed higher than for double hung sash windows and a window of lesser height used. The 48″ height of glass being considered a good average size, that is a more suitable and satisfactory size for this type of window.

Detail Section "A" shows section through wall at casement window, with wood joist floor construction, placing the sill approximately 3′-0 above floor with 10″ joist. The structural lintels are formed by the stone lintel on outside of wall and by reinforced tile lintels on inside, constructed as described on sheet No. 6; *see detail "E" on plate drawing No. 10.*

Detail "B" shows an alternate spandrel section for use with long-span fireproof floor construction. The reinforced concrete lintel being similar to that shown for sash widows on plate drawing No. 11. The method of constructing these lintels is shown by detail "C" on that plate.

Detail "D" shows a section through casement window jamb and details "E" and "F" sections through narrow and wide mullions, all of which would be the same for either load-bearing or enclosure walls. The wide mullion shown by detail "F" could be increased in width to form piers between windows of any width desired. Increases in width should be made in multiples of full and half tile to avoid cutting and waste.

Detail section "C" shows a spandrel section with same size of casement window and similar wall construction, with long-span fireproof floor construction, but **for enclosure walls.** In this instance the steel spandrel girder is indicated as composed of a pair of channels riveted back to back and connected to column with gusset or connection plates on the face of column flange, which is turned out parallel to face of wall. The lower part of steel spandrel girder is fireproofed with tile and the concrete floor construction poured around the upper portion. This concrete is kept back about 2½″ from inside line of stone facing and after being coated with an asphaltic waterproofing, a slab of tile set in non-staining mortar is interposed between the concrete and back of limestone facing to prevent any direct contact between same.

Similarly the reinforced concrete lintel member shown by detail Section "B" is kept back from stone, and after being coated with asphaltic waterproofing, 2″ Hollow Tile set in non-staining mortar is interposed between the concrete and Indiana Limestone facing.

DRAWING NO. 13—ENCLOSURE WALLS OF SIMILAR TYPE CONSTRUCTION

The plate on third page shows details for this form of construction, used for the enclosure walls of skeleton frame buildings. Where the steel columns are fireproofed with Hollow Tile or Brick the normal face of column flange turned out towards face of wall should be at least 9″ and preferably 9½″ or 10″ in from face of wall to provide for 4″ of brick or Hollow Tile, with a suitable allowance for joints, between the steel and inside face of 4″ Indiana Limestone facing. This is the minimum that should be allowed, as even with this allowance the extra thickness of connection or gusset plates and rivet heads will require that a 3″ thick tile be used at these points and in the case of brick column enclosures that some cutting of the brick may be necessary.

Even with concrete fireproofing, 8″ is about the least that can be allowed between face of wall and normal face of steel columns where the usual minimum thickness of from 2″ to 3″ over the extreme edge of metal is required.

Variations in the alignment of steel and in fireproofing make it impractical to work to anything closer than above. Where 9½″ is allowed, this will place the center of gusset or connection plates on face of column about right for the sizes of spandrel beam that would ordinarily be used and bring the edge of beam flange about 6″ to 6½″ in from face of wall, permitting the usual 1½″ to 2″ of fireproofing and a suitable allowance for joints in back of the limestone facing.

Detail Section "A" shows typical section through a straight wall without window openings and Detail "B" the spandrel section at windows. These details show clearly the method of covering spandrel girders and the support of fireproof floor construction *which has already been referred to in connection with Detail "C" on Plate 12.*

Spandrel girders may be either plain "I" beams, pairs of channels back to back, or built-up plate and angle members.

Detail "C" shows an alternate spandrel section with the position of floor construction placed 2″ lower than in detail "B," placing the sill about 2′ 5″ above floor to provide for 28″ high radiator under windows.

Detail "D" shows section of mullion, which does not differ from the narrow mullions for use with load-bearing walls.

The substitution of thin concrete slab or Hollow Tile Arch floor construction, would not change the wall details in any way, unless the spandrel girders were made appreciably deeper in section, which would involve some change in size of windows and relation of heads and sills to floor construction.

Where it is desired to increase the story heights, for either load-bearing or enclosure walls with this form of construction, the change should be made by adding a pair of stone facing courses, thus increasing the height by either 1′3″ or 2′6″, and so on by 1′3″ units.

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Indiana Limestone Service Publication
Series D4
Drawings 15 and 16

INDIANA LIMESTONE
The ARISTOCRAT *of* BUILDING MATERIALS

DETAILS *and* DATA SHEET NUMBER 8
June, 1922

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT ***of the***
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

TYPICAL DETAILS AND LAYOUT FOR THREE-UNIT QUARRY-RUN RANDOM INDIANA LIMESTONE ASHLAR

SHOWING DETAILS TO ILLUSTRATE THE APPLICATION *of a* PROPERLY BONDED 3-UNIT RANDOM ASHLAR *of* THE ROUGH-SAWED LIMESTONE *for* THE FACING OF DWELLINGS AND OTHER LIGHT BEARING WALLS

THE development of a simple form of 3-unit RANDOM ASHLAR facing, embracing all color tone and texture variations, it is thought, will fill a great need and place within the reach of many prospective builders desiring to use stone, the **Random Indiana Limestone Ashlar,** a beautiful and economical type of limestone facing that can readily be cut to the required sizes and be erected by masons.

The material being produced by machinery at quarries in a semi-finished form obviates the freight and other transportation charges on most of the waste and reduces to a minimum the hand labor required to prepare this material for the building.

This scheme is based upon using Quarry-run stone in rough sawed-four-side strips of random length for cutting to lengths required on job. The 3-units employed are 5", 10½" and 16" in height, and the sectional sizes of stone 5" x 8", 4" x 10½" and 4" x 16". The first size, 5" x 8", supplies the bond course, and when split in half produces two 4" x 5" sections to serve as the small unit and for fillers, wherever the bond is not required.

A facing compound of these size units can be laid up with either brick or hollow tile backing as the 5", 10½" and 16" heights are equivalent to two, four and six courses respectively of standard common brick work and to one, two or three courses of the 5" x 8" backing up tile, enabling the laying up and bonding of the two materials without cutting.

The split material may either have the sawed face turned out, or as indicated on plate drawing, the split rock face be turned out, adding a further variation to the texture and appearance of wall by distributing these small split-rock-faced units throughout the surface area of wall.

The general appearance of wall may be further varied by changing the general proportions of the units, that is by changing the average lengths; making the units either rather square in shape, by averaging the lengths of the major units around one and a half times their height, or by accenting the longitudinal dimension by making the more important units average around twice their height or more in length.

The joints may be struck flush or be raked out. The joint for this type of work unlike CUT STONE, is completed at the time the stone is set, a practice which is customary with masonry; only the trim, (when trim is used) being set with a close joint raked out an inch deep for pointing up afterwards.

A half-inch width of joint is considered to be about right for this type of RANDOM ASHLAR masonry. This, however, can be diminished a little or increased, as desired. It is never practical, however, to make such joint less than three-eighths of an inch in thickness, and if made more than five-eighths to three-fourths inch, the advantage of stone bonding with brick or tile backing is lost, as this would require rather thick mortar joints in the backing, unless backing units that ran somewhat over-size could be obtained. Therefore, where a very wide mortar joint is desired, the stone units should be sawed about a quarter of an inch scant of the height dimensions given.

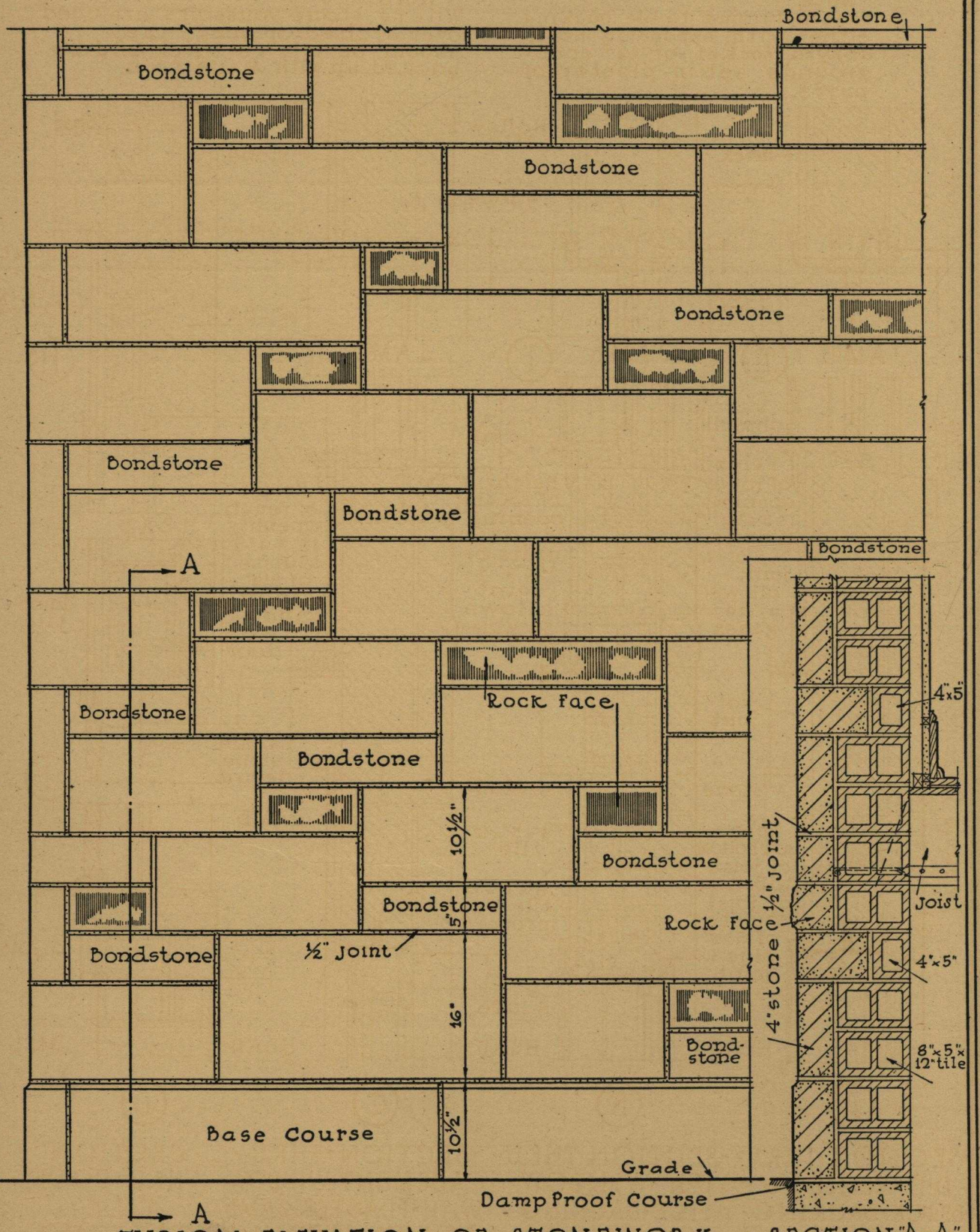
Another advantage of this form of construction, is in the placing of doors and windows. The 5" height of stone will course in with the window sills, and the lintels can be made either 10½" or 16" in height, to course in with either of the larger units;—10½" generally being preferable. The scheme is such that it permits fixing the sill and lintel heights in steps of 5½" and thus enables a number of different size windows to be used, placed either at equal or varying heights in the wall.

The exposure of 4" heads of stone facing at corners is not considered objectionable for this type of construction and the quoining or bonding at corners is, therefore, accomplished by the alternating of heads and facets chiefly of the two larger units at corners.

For further description and reference to the different detail sections shown on plate drawing No. 15 and 16, see last page.

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INDIANA LIMESTONE



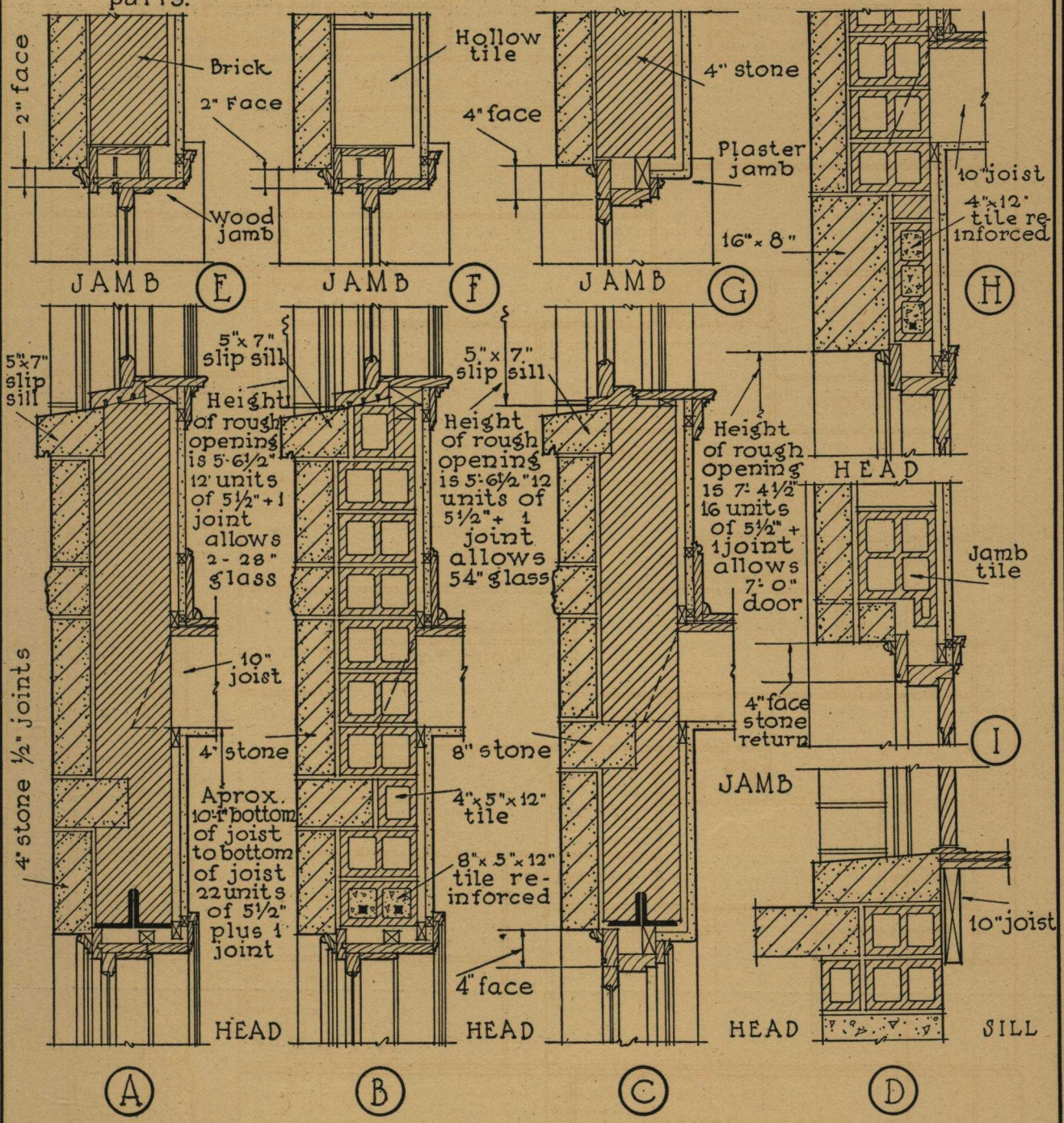
TYPICAL ELEVATION OF STONEWORK SECTION A.A.

SCALE 0" 3" 6" 9" 12" DATE – MAY – 1922	TYPICAL RANDOM ASHLAR LAYOUT FOR FACING COMPOSED OF THREE SECTIONAL UNITS	DRAWING NO. 15. SERIES · D 4 · 5 ·

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Note :-
Fasten furring to tile backing either with expanding nail, ankyra socket, or ¾" spot grounds set in plaster of paris.

Note :-
Where stone voussoirs are used over arched opening they should be 10½" x 8" thick and be backed up with 4" tile arch.



SECTION THRU D.H. WINDOW BRICK BACKING

SECTION THRU D.H. WINDOW TILE BACKING

SECTION THRU CASEMENT WINDOW WITH PLASTER JAMB BRICK BACKING

SECTION THRU DOOR TILE BACKING

SCALE 0" 3" 6" 9" 12" DATE – MAY – 1922.	TYPICAL DETAILS FOR THREE SECTIONAL UNIT RANDOM INDIANA LIMESTONE ASHLAR FACING.	DRAWING NO. 16. SERIES · D4 · 6 ·

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Where it is desired to use a RANDOM ASHLAR of this type, backed up and bonded into end-construction hollow tile, said tile should be cut to a 10½" length (*or height when built in wall*), with the occasional introduction of 5" high filler tile, in order to level up backing where the bond stones occur.

Architects giving a little study to the details for this kind of construction, will find that it has a wide range of usefulness in moderate cost buildings where a suitable Limestone facing with various types of backing is so often desirable.

PLATE DRAWING NO. 15
THREE-UNIT RANDOM ASHLAR LAYOUT

The Plate on second page shows the layout of this RANDOM ASHLAR scheme for a portion of wall at corner of building, indicating the position of bond stone and the split material having exposed rock face. These latter stones, however, as stated on first page, could have the rock face turned in, when this particular effect was not desired, so that all stone would have the rough sawed face.

Detail marked, "Section A-A" is section through wall just above grade course indicating the manner in which the Indiana Limestone facing is bonded into hollow tile backing. If common brick backing was used, the only difference would be that where one tile is shown, two courses of brick would occur, the construction otherwise being identical. ***A proper damp-proof course at grade level should not be overlooked.***

PLATE DRAWING NO. 16
WALL SECTIONS FOR THREE-UNIT LAYOUT

The Plate on third page shows a series of details for the form of construction indicated in elevation on drawing No. 15. The arrangement at sills, jambs and heads of door and window openings, for both brick and hollow tile backing, are clearly indicated.

It will be noted that the employment of twenty-two 5½" units of height, equalling forty-four courses of Brick or twenty-two courses of tile give a height of 10'-1" bottom to bottom of joist, or a clear ceiling height of about 9'-0" in first story. The ceiling height in second story can be the same or this can be reduced 5½", 11" or 16½", by the omission of one or more units.

Height of rough openings for door is fixed by 16 units at 7'-4½" which is just right for a 7'-0" door with proper frame allowance.

By allowing 12 units for height of main windows, this fixes the height of rough opening at 5'-6½" which is just right for a 28" glass height in both sash for double hung sash windows or an equivalent height of casement sash.

The inside sills of windows in lower story will be fixed at either 2'-1" or 2'-6½" above finished floor and at same height in second story, where the 2'-6½" height would be best because this height permits the use of either 26" or 28" high radiators under windows. Where stripping between floors is necessary to provide space for metal conduits for electric wiring between rough and finished floor, on account of Building Code requirements, these sill heights would be 1½" less in both instances. Service windows would generally have the heads fixed at same level as heads of main windows and be 12" less in height, having 22" high glass in both sash. This difference of 12" in rough opening being provided by making it 2 units less in height and using a 6" slip sill to take up the extra 1". The wash on these 6" slip sills being cut to a deeper slope for the sake of a more uniform appearance.

Note:—From the above and an inspection of the details, it will be noted that this all works out to a sort of standardized construction for residences, also other buildings in which the window and ceiling height requirements are similar.

Detail at "A" is a section of double-hung window head for Hollow Tile Backing showing the use of re-inforced Hollow Tile Lintel for support of backing over single window opening. If the opening were very wide a deeper structural lintel would, of course, have to be used.

Detail at "E" is section through sill and jamb for double-hung window with Brick Backing and Detail at "G" the similar section for Casement windows.

Detail at "F" is section through sill and jamb for Hollow Tile Backing.

Details at "D", "I" and "H" respectively show the sections through door step and threshold, door jamb and head. Detail at "D" indicating the manner of providing bearing for support of stone or concrete slab forming floor of porch or landing platform.

Detail at "I" indicates the method of returning stone facing into door jamb and Detail at "H" the use of 8" thick stone lintel over door. Lintels having 8" bed could also be used over casement windows where these are arranged in pairs, or wherever a greater width of opening made a Lintel thicker than 4", advisable.

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A. I. A. Classification No. 8 b 2

Indiana Limestone Service Publication
Series D4
Drawings 17 and 18

INDIANA LIMESTONE
The NATION'S BUILDING STONE

DETAILS *and* DATA SHEET NUMBER 9
October, 1924

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

DETAILS OF TWO LARGE INDIANA LIMESTONE CORNICES

SHOWING TYPICAL FORMS IN THE ROMAN CORINTHIAN ORDER APPLIED TO STEEL-FRAME BUILDINGS

THIS sheet shows two large cornices for steel frame buildings. Cornices of this size are not frequently encountered in the average office, but they require considerable study for their correct and economical treatment. There is a great dearth of information as to how they should be constructed and supported.

The wall at the top of a tall building is not wide enough to balance a large projecting cornice, and it must be carried by other means. Most suspension hangers are of comparatively small diameter, and should their cross-section be much reduced by rust or corrosion, their supporting value is lost and the stone is apt to fall unless some arching action takes place and adjacent stones take the thrust and thus carry the load.

A general and sweeping condemnation of all hanging supports is not implied. When properly and securely fixed in the stone, with sufficient cross section and ample protection against rust, such a support is quite permissible, especially for light work. It should not be made to carry a very large stone nor any except the one in which it is inserted.

Ordinary expansion bolts are not recommended, because they sometimes pull out and because of the splitting action they tend to exert on the stone. Lewis anchors are much more satisfactory in this respect, and there are various other apparently good types of support on the market. At our request, the Bureau of Standards is conducting tests with different methods of suspension, and its report will give accurate information on points concerning which there is still considerable lack of knowledge.

The cornices shown on this folder are designed for construction not requiring rod suspension. The support is positive, by which the stone is carried on steel and not hung from it. The lookouts are bolted or riveted to the steel frame and are thoroughly secure.

On account of the more or less frequent inaccuracies in steel framing, the Architect should specify and insist that all steel upon which the stone is carried must be very accurately placed with regard to level, relation to the wall line, and spacing. He should require that the steel contractor be prepared to have men at the building at the call of the stone setter to make any necessary adjustment, and that he be responsible for any expense incurred through having to cut stone to fit around steel not fabricated or placed exactly as shown on the drawings. This would help to have the steel correctly erected at the outset. At the same time, ample clearance should be shown on the details, with provision for minor adjustment by washers, etc.

Moisture penetrates through the joints of a cornice more readily than at almost any other place, and the utmost care should be taken to protect both the back and the top of the cornice. Water from driving rains and melting snow will soak through the wall and tend to rust the steel and also to convey soluble constituents of the bricks or mortar through the wall, depositing them as white efflorescence or causing dark stains on the face of the stone. Hangers of all kinds should, therefore, be carefully protected by being coated with heavy asphaltum paint or by galvanizing, either treatment being done after the anchor has been bent to shape.

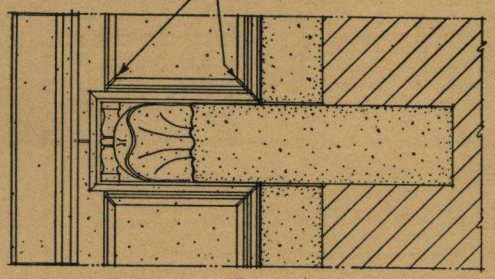
The entire back of a parapet should be flashed, or at least heavily coated with asphaltum, to stop the penetration of moisture from behind. To prevent similar results from water percolating through the top of the cornice, the flashing should be brought close to the edge of the stone, and the remaining exposed part of the top joint should be well grouted with lime mortar or non-staining cement. The joint should then be pointed with mastic cement of a quality which will adhere tenaciously to the stone and yet remain elastic enough to take up expansion or contraction due to temperature changes. At the same time it might be mentioned that the temperature coefficient for Indiana Limestone is extremely small when compared with either clay products or concrete.

In the recommendation that the flashing raglet should be cut near the front of the stone, it should be realized that here is a source of danger unless the pointing of it is well done. Should water get into the raglet and freeze, the top of the cornice is in danger of being split off.

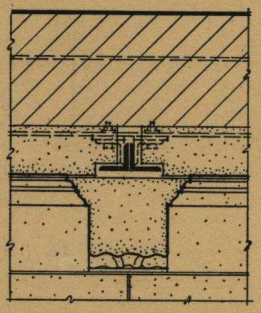
It is hardly necessary to add that no attempt has been made to calculate the correct sizes of the steel. This must be done by the Architect or the Engineer, aware of all the factors governing the case. Circumstances will probably require changes in the size and contour of the mouldings. These designs are merely typical forms, containing suggestions which may be found of assistance when designing this part of the building.

For further description and reference to the different detail sections shown on plate drawings Nos. 17 and 18, see last page.

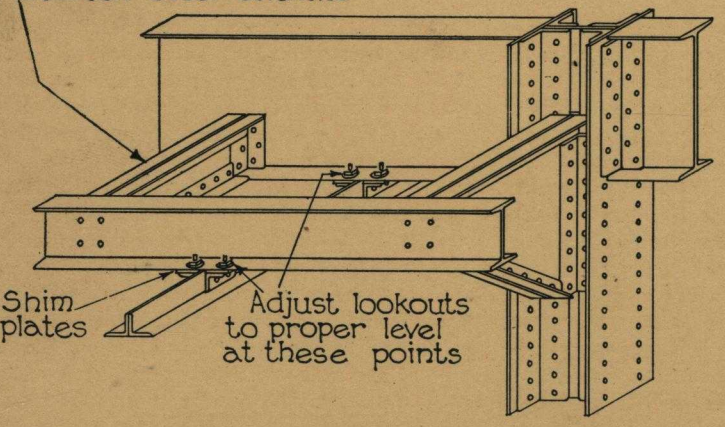
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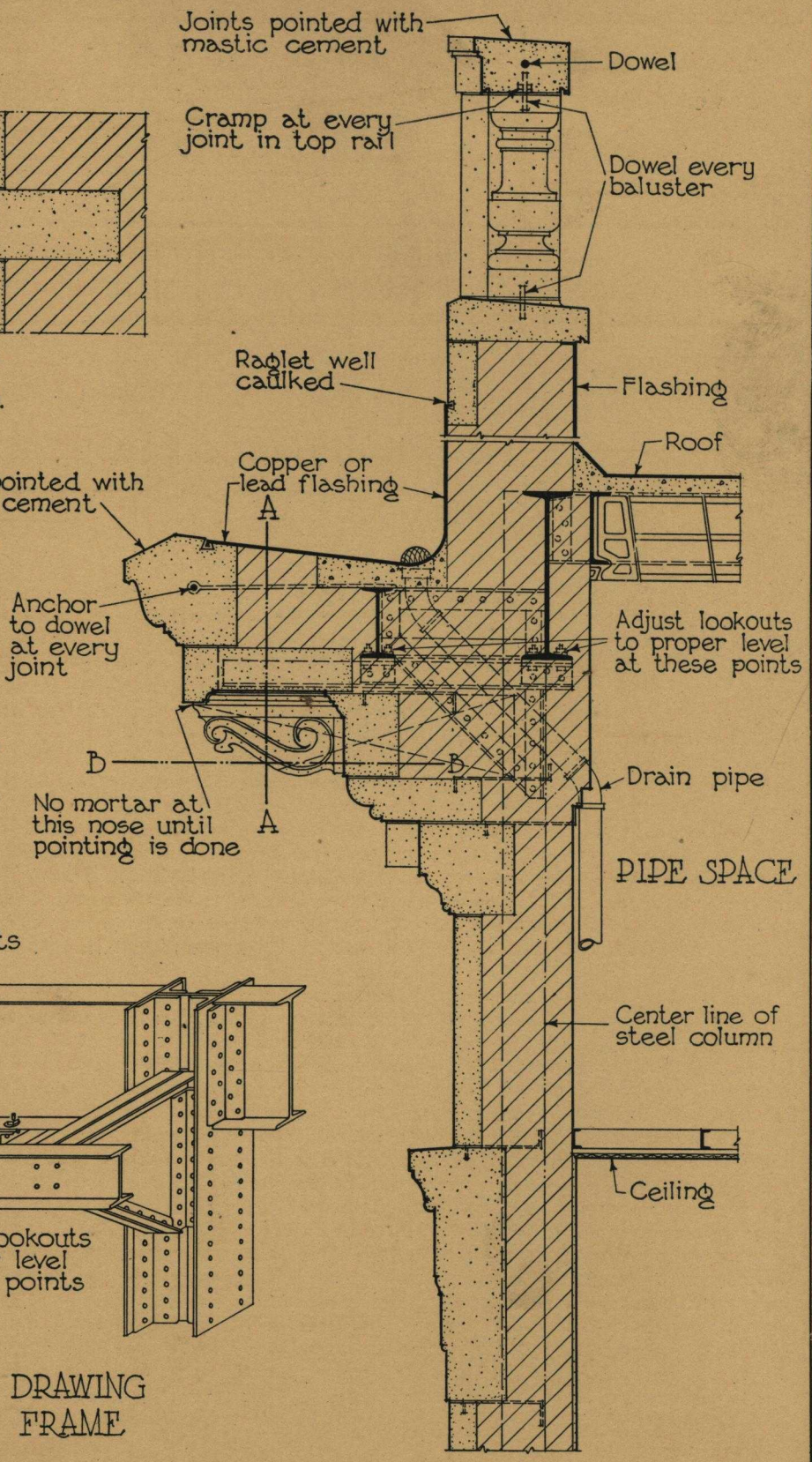
PLAN "B-B"
(Looking Up).



SECTION "A-A
(Front Elevation)

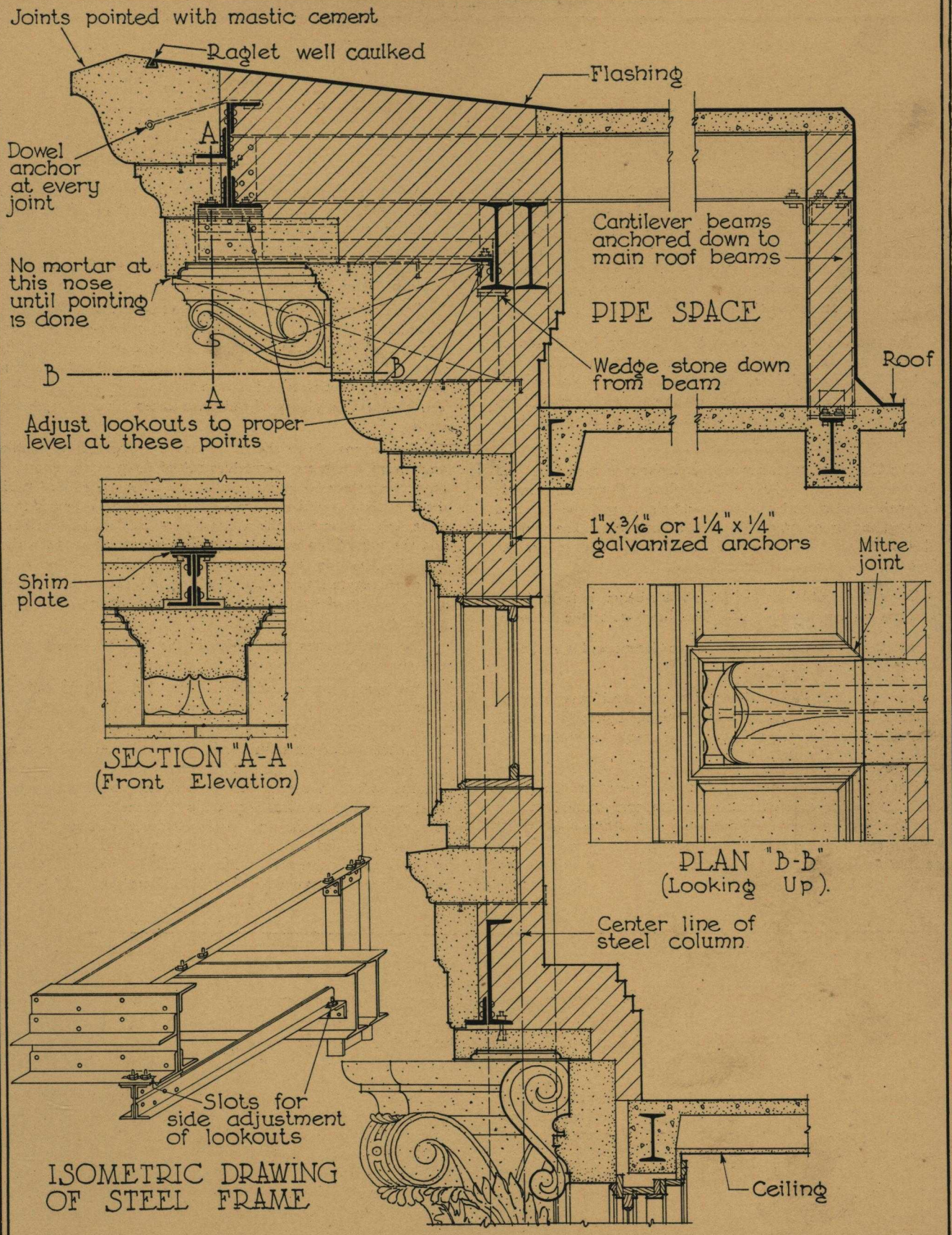


ISOMETRIC DRAWING
OF STEEL FRAME



SCALE 0" 3" 6" 9" 12" 18" DATE - AUGUST 1924	DETAILS OF INDIANA LIMESTONE CORNICES ROMAN CORINTHIAN ORDER WITH PARAPET - STEEL FRAME BLDG.	DRAWING NO. 17. SERIES - D 4 - 7.

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SCALE 0" 3" 6" 9" 12" 18" DATE - AUGUST 1924.	DETAILS OF INDIANA LIMESTONE CORNICES ROMAN CORINTHIAN ORDER - STEEL FRAME BUILDING	DRAWING NO. 18. SERIES - D 4 - 8.

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DRAWING No. 17
ROMAN CORINTHIAN CORNICE WITH PARAPET

This plate shows a Roman Corinthian Cornice surmounted by a parapet and balustrade—a type widely used. It is about the size that would be used on the average self-contained-bank building or on a tall building where the design shows an order occupying the two upper stories. On the latter the height from the cornice to the balustrade would be much greater than on the former on account of foreshortening.

The two lower courses are self supporting, but should be anchored to the brickwork as well. The modillions are wedged down from the steel at their backs, and the stones filling the space between them are anchored. As the mouldings of the modillions are mitred against those of the fillers, it is impossible for the latter to fall out.

The Corona rests on a cantilever lookout at each joint and the stones are simply lowered into place. Provision is made for small adjustment by washers and shims, and the lookouts can be lined up exactly. When the stone is set, the joint is filled with grout to make the whole secure and to protect the steel.

The outer double channel (or single I-beam) is framed out from the main wall girder, with deep brackets at the columns.

The top course rests directly on the Corona and is anchored back for additional security.

The isometric sketch shows how the steel may be constructed. Many factors enter in to change particular details, but adherence to the chief features can usually be maintained.

Care should be taken that the flashing is well done. The whole of the valley formed by the down slope of the top of the cornice should be covered with lead or copper, securely wedged into the raglet on the top of the top cornice stone, and carried up to a raglet in the face of the parapet. At the back of the parapet, too, the protection should be of the best and carried up the full height.

DRAWING No. 18
LARGE ROMAN CORINTHIAN CORNICE

A cornice of this size, although much larger than is usually encountered, is sometimes required. On account of its great overhang, considerable care must be used to give the proper support, and weight must be saved whenever possible. The textbook projection is greater than is shown here, but the effect would probably be somewhat oppressive.

The Corona above the dentils should be anchored, although it cannot very well fall out after the modillion course is set. The fillers between the modillions will balance, but should be anchored also. The modillions themselves will balance, but an added precaution is to let them catch under the wall girder. There should be plenty of clearance under it to facilitate the setting.

The Corona above the modillions is supported on double angle irons which are themselves bolted down at one end to a bracket on the wall girder, and at the other are carried from the overhanging girder above. These stones must be slid into place, the bottoms of the vertical joint caulked temporarily, and the joint filled with non-staining cement grout from the top. In detailing this part of the steel, the bottom flange of the overhanging girder should be kept well above the top bed of this course of stone so as to make the setting as easy as possible.

The two courses above should be well anchored, thus relieving the stone below of much of their weight.

The pipe space extends all around the building, and its inner wall contains tension members tieing the ends of the cantilever beams down to the main roof girders.

The jointing of the soffit should be noted. As shown here, it is planed right through and cut off to the required lengths. The mouldings on the modillions form the panels. As somewhat more rough stock is required by this method, some stone cutters may prefer the more usual custom of running the bed through level and cutting the panels on the Corona course. In either case, where the modillions meet the spacers between them, the mouldings are cut to make a mitre joint.

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J. Hoadley & Sons Co.	Bloomington, Ind.	Reed-Powers Cut Stone Co.	Bedford, Ind.
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A. I. A. Classification No. 8 b 2

Indiana Limestone Service Publication
Series D4
Drawings 19 and 20

INDIANA LIMESTONE
The NATION'S BUILDING STONE

DETAILS *and* DATA SHEET NUMBER 10
October, 1924

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

DETAILS OF TWO LARGE INDIANA LIMESTONE CORNICES FOR STEEL-FRAME CONSTRUCTION

SHOWING JOINTING AND CONSTRUCTION OF A GREEK DORIC CORNICE AND OF AN ITALIAN RENAISSANCE CORNICE

TWO representative cornice details are illustrated herewith. Every building has special requirements and every Architect has his own ideas of design. When steel construction enters into the case, many more factors have to be taken into account. It frequently happens that the steel is designed with little consideration of the cornice, and complications difficult to overcome are thus introduced. Close collaboration between the Engineer and the Architect will not only tend to prevent such difficulties from arising, but will often result in the steel being placed exactly where it is needed to carry the cornice, thus turning an apparent obstacle to decided advantage. Suggestions presented in these designs may help in the solution of such problems; at least they may contain some useful hints.

Efflorescence on stone or brickwork is unsightly and can be taken as a pretty sure evidence of faulty construction. It is almost always due to moisture coming through from the back or interior of the wall, carrying with it in solution salts which are deposited on the surface as crystals, fine as powder, as the moisture evaporates. The salts from ordinary grey portland and some other cements have the additional objectionable habit of sometimes causing dark stains on the face of light colored stones. Efflorescence is usually considered as nothing more than a disfigurement which is washed off after every rain, but it is not quite so harmless as that; the growth of the crystals just under the surface has been known to split small fragments from the face when allowed to continue.

Staining and efflorescence, occasionally seen in various places on new buildings, usually soon disappear, remaining longest at the cornice or at the parapet. The reason for this is that moisture in the bricks and mortar comes out at first, this action ceasing as the walls become dry, whereas every rain or snow storm renews the unsatisfactory condition in certain exposed places. The obvious remedy is to keep the wall well protected from water as it is built, and to flash and caulk the unprotected places to prevent moisture from entering after it is finished. Metal flashing should cover horizontal projections, and metal or asphaltum, either as composition flashing or heavily painted on, should protect the back of parapet walls. The exposed joints should be carefully filled and then pointed with a first class mastic pointing cement.

The procedure outlined above not only protects the stone from unsightly disfigurement, but also, by keeping moisture away from the steel, prevents it from rusting, and insures dry ceilings and walls in the top story and behind projecting belt courses.

Very few conditions can be laid down about the general construction of the cornice, but some cautionary safeguards should be observed:

Do not detail the cornice from the standpoint of the stone cutter alone; consider the setter's problems also.

Do not indicate more cutting on the back of the stone than is necessary; it adds expense without showing anything in return.

Do not put in a horizontal joint where it is not needed; this will save the cutting of two beds and will make less handling at the mill and at the job. (By way of an exception, by making a joint at the top of the dentils, most of the cutting of them can be done by machinery.)

Do not invent too elaborate a system for suspending the stone; a simple method is usually much better and cheaper.

Do not hang a stone if it can be supported from below; if this is not possible, use Lewis anchors in preference to expansion bolts.

Do not depend on the steel being placed with absolute accuracy; keep the stone well away from the steel and provide for simple adjustment of the lookouts, anchors and bolts.

Do not forget that steel work has bolt-heads, nuts, and plate connections, all of which take up space; sometimes all the strength of a stone must be cut away to clear these projections; it would be much better to design the building with the steel a little farther back from the wall line.

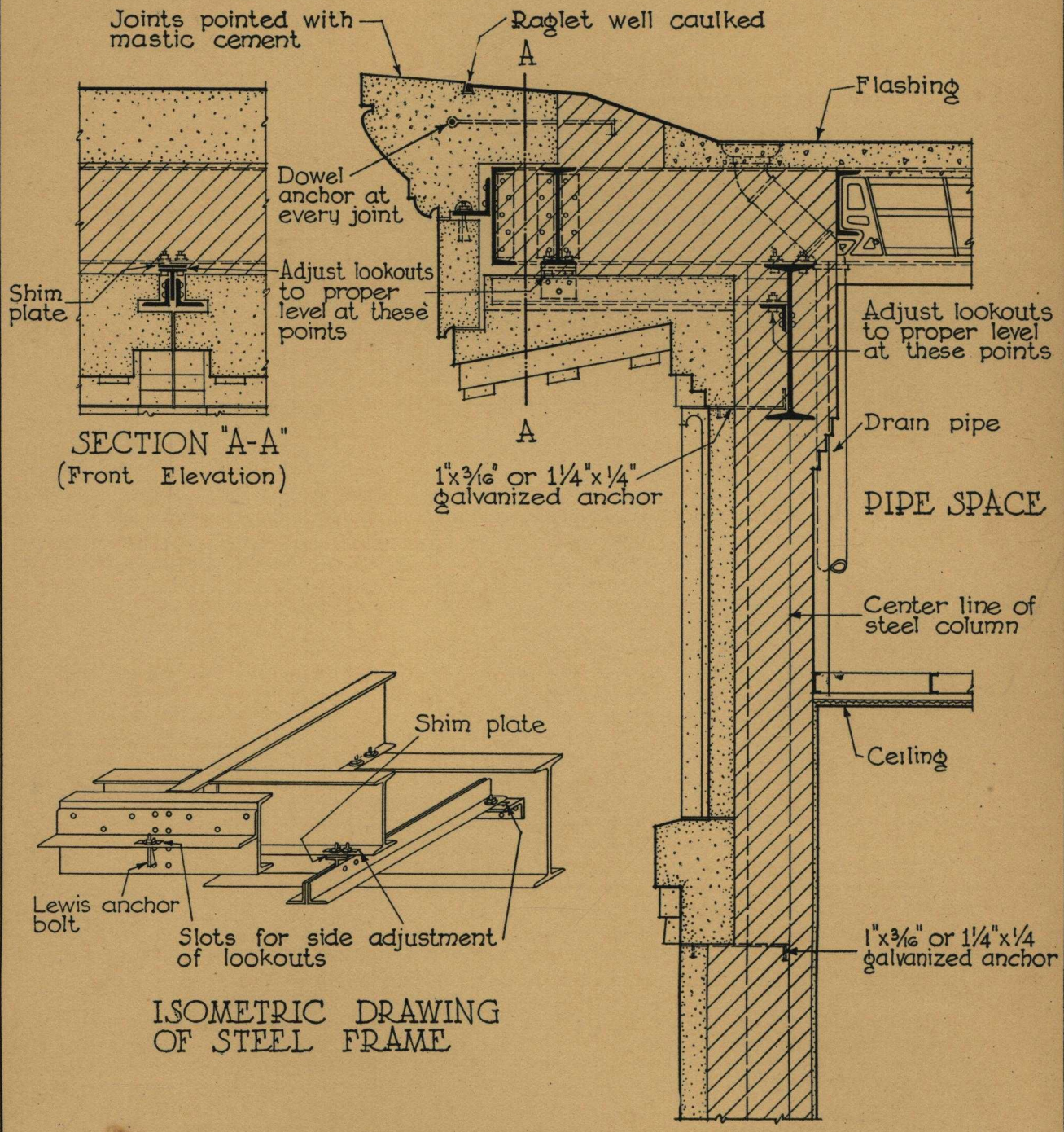
Do not remember to provide ample anchorage for individual courses in a high parapet wall but forget to anchor or brace the wall itself.

Do not show mortar against the back of the stone unless it is specified to be mortar of lime or of non-staining cement, and not of ordinary portland cement.

For further description and reference to the different detail sections shown on plate drawings Nos. 19 and 20, see last page.

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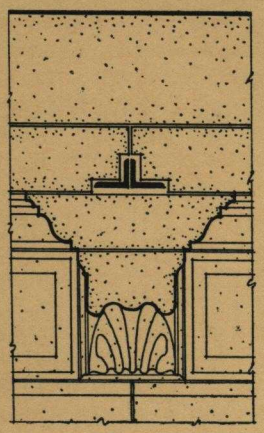
INDIANA LIMESTONE



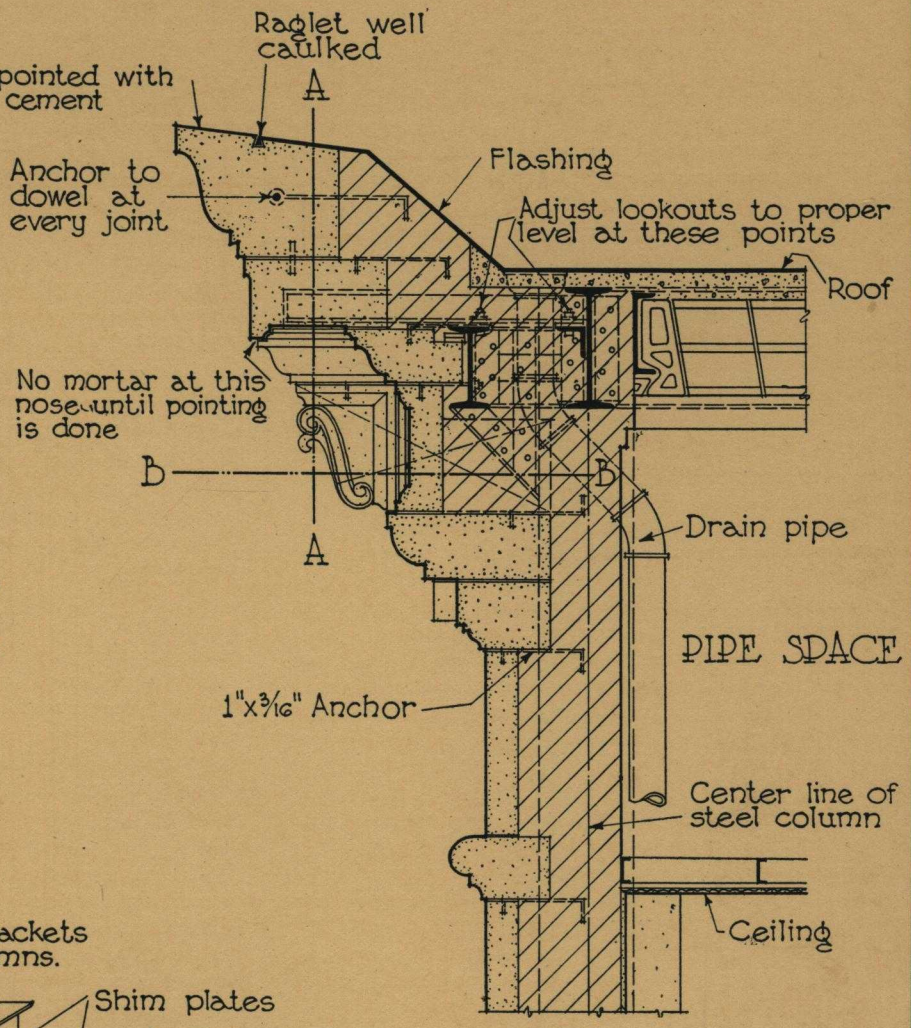
ISOMETRIC DRAWING OF STEEL FRAME

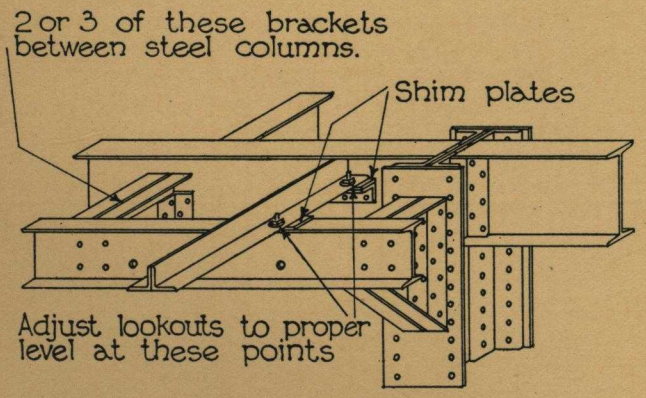
SCALE 0" 3" 6" 9" 12" 18" DATE - AUGUST 1924.	DETAILS OF INDIANA LIMESTONE CORNICES GREEK DORIC ORDER - STEEL FRAME BUILDING	DRAWING NO. 19 SERIES - D 4 - 15.

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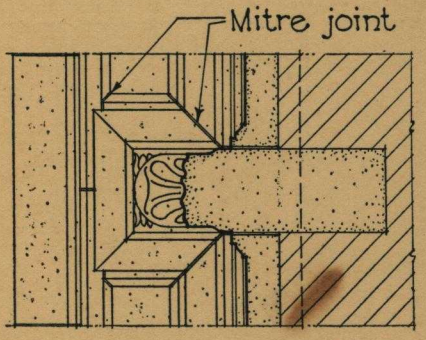


SECTION "A-A"
(Front Elevation)





ISOMETRIC DRAWING
OF STEEL FRAME



PLAN "B-B"
(Looking Up).

SCALE 0" 3" 6" 12" 18" DATE-AUGUST 1924.	DETAILS OF INDIANA LIMESTONE CORNICES ITALIAN RENAISSANCE - STEEL FRAME BUILDING	DRAWING NO. 20. SERIES - D 4 - 16.

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DRAWING No. 19
GREEK DORIC CORNICE

The Cornice illustrated in this drawing is for a fairly tall steel-frame building.

The large overhanging Corona, with no supporting bracket or modillion, offers the greatest difficulty. It may be made in one piece or, as shown here, jointed, at the only point where a break occurs on the face, to save weight and material and for ease in setting. It is supported by two angle irons riveted together, one end resting on an angle attached to the main wall girder, and the other suspended by angle-iron brackets from the overhanging top girder. They are framed along with the rest of the steel construction and are adjusted to the exact position by washers and shims.

After the frieze course is set, the larger stone of the Corona is hoisted clear of the building, and when it reaches its level is drawn back into position, sliding along the angle-iron lookouts. It is then propped up from the projection of the Architrave, the bottom of the vertical joint is packed temporarily with oakum or old newspapers, and the joint is filled with grout of non-staining cement.

After this the thin face stone of the Corona is set, its weight on the stone below being relieved by Lewis anchors.

Care should be observed in setting the Cymatium so that the steel takes all of the weight and none is carried by the stone below. Cutting out the back of the stone is always to be discouraged, but in this case it is necessary to give a bed for the stone; even then, good anchorage into the backing should be provided.

For the other type of Greek Doric Cornice, where a high flat ornamental cresting takes the place of the projecting Cymatium, some change may be made with advantage. The larger outer girders can be replaced by one high single one, with its bottom slightly above the top of the Corona. This affords a substantial foundation to carry angle sections for supporting the high upper stones, and it can be punched to allow anchors from them to go through it and be bolted. The fill behind it should fall away quickly to save weight.

DRAWING No. 20
ITALIAN RENAISSANCE CORNICE

Cornices of this style have one advantage over the older Classic orders in that their projection is much less in proportion to the height. The tendency of present-day designers is to avoid cornices with great overhang on tall buildings and to give much less emphasis to the horizontal lines, especially at the crowning feature, than was the custom a few years ago. The failure of less durable material, with unsatisfactory methods of suspension as contributory causes, has aroused such grave doubt in the minds of Building Officials that they are very strict in their requirements for all overhanging courses.

This cornice is economical of material and is easy to set. The two lower courses are self-supporting, with anchors for additional security.

While being set, the modillions must be propped from the projecting Architrave, or held until the nuts on the anchor bolts running back through the web of the I-beam are tightened. Complete stability is attained when the course above is wedged at the back under the flange of the I-beam.

It will be noted that this last-mentioned course is higher at the back than at the front. It is shown in this way so that all of the mouldings may be worked on this stone, leaving the soffit of the Corona course flat and capable of being planed through without having panels cut in it. Also, there is not the same necessity of having to set the Corona with the extreme accuracy that would be required in order to make the mouldings of the panel fit the stone below. On the other hand, a little more stock is used and no constructional advantage is gained.

The setter may find it more convenient to leave the lookouts disconnected until ready to set the Corona. By using washers and shims, these lookouts can be easily adjusted to the correct level and line, and the stones of the Corona are laid in place between them. When set, the face and bottom joints are caulked temporarily, and non-staining cement grout is poured in the top in order to fill the joint completely.

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Indiana Limestone Service Publication

Series D4

Drawings 21, 22 and 23

BUILD THE NATION SECURELY WITH INDIANA LIMESTONE

The NATION'S BUILDING STONE

DETAILS *and* DATA SHEET NUMBER 11

April, 1925

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*

INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

THE DETAILING OF WALL PIERS

DRAWING NO. 21

CONSIDERABLE difference in appearance and cost depends on the jointing of piers. Those shown on Fig. 1 are all of the same width and the courses are all of the same height, but there is great dissimilarity in the effects produced. Many vertical joints and higher courses tend to give a slim appearance.

Often structural steel or concrete columns come behind piers, and ample room should be given to clear them. Steel columns are usually required to have a fireproof covering of at least two inches at the thinnest point, which means that this much must be allowed over and above the bolt or rivet heads and splice plates. Steel is not always erected with absolute precision, and warping or inadvertent moving of forms for concrete columns often changes their size and position. Plenty of clearance for the stone must be provided to allow for such discrepancies, and an additional inch space should be given to permit of parging the back of the stone with lime or other non-staining mortar.

Thus the size of the columns and their position, particularly with respect to their distance from the wall line and the face of the pier, have often a very important influence on how the piers have to be jointed. Careful study of all the conditions affected by their location is advisable; almost always it results in changes in the details which fully justify the trouble taken.

Cutting out the back of a stone is an operation that gives nothing in return for its expense. Sometimes a little of this is offset when many L-shaped stones require a piece of usable size cut out, but the cutting generally costs more than the reclaimed piece is worth. Not all cut stone plants have machinery that will take out intact the core from a U-shaped stone, and it is a slow process otherwise. It is far better to keep back the face of the structural members so as to clear the stone entirely; if this cannot be managed, it should be possible to clear all but the bond stones. The plans of the piers in Fig. 1 indicate how much back-checking is necessary to avoid a column whose face comes out to the wall line.

In Pier 1 and Pier 3, the narrow front face of the side stones should be considered. A minimum of 4″ is sometimes used, but in an unbroken ashlar surface this is perhaps rather narrow; 6″ or 8″ is usually sufficient unless a massive effect is desired. This dimensioning may be governed also by the width of the structural member so that no back-checking will be required.

Should the pier have considerably more projection, the bonding would work out more like Fig. 2. If not much over 6″ or 8″, there would hardly be room for a joint in the return of the bottom course of Pier 1 and in similar places, as the piece of ashlar behind it would be altogether too small. Compare Fig. 1, where there is no joint in the side, with Fig. 3, where the piers have much greater projection.

In such piers that stand out some little distance from the wall line, it is not well to use the same jointing schemes as those of Fig. 1. In Pier 2, the bottom course would require considerable stock if designed with no vertical joints showing, and it would require a U-shaped stone if the structural column stood out beyond the normal wall face. As mentioned above, a U-shaped stone is to be avoided, not only on account of its cost, but also because of the danger of breakage in handling and through stresses set up by unequal settlement of the wall, and the difficulty of making a perfect bed for such a stone.

For similar reasons, although in a less degree, it is well to avoid L-shaped stones with a long leg, and this is done by introducing vertical joints in the side returns, as shown in Fig. 2. Piers 1 and 3, Fig. 2, are economical in design, calling for no back-checking.

If no structural member occupies the space formed by the piers, the problem is much simpler. It should be remembered of course that concealed stone is not a profitable investment and that great bond stones should be avoided if expense is an item.

For anchoring, the usual practice is to put one anchor in a stone less than two feet long, and two if it is longer. Anchoring stone to stone is generally better avoided, for it requires very carefully made anchors to fit the space exactly.

If the pier is high, or if there are very unequal conditions of loading, such as where a heavy cornice rests on its outer face and the spandrel walls carry little or nothing, it is better to provide a slip-joint without bond between the wall ashlar and the pier stones, as in Fig. 3. A more economical method is that shown in Fig. 4, which involves no back-checking. The latter detail is seen on drawings from some of the best offices and is considered very good construction, provided the contractor does not fail to anchor the stone properly.

Piers can be wide and flat, or narrow and with considerable projection, but the jointing should always be studied, especially if structural columns are placed in the wall behind them. They need not be confined to the square plan but may be varied in many ways. Two are shown in plan in Figures 5 and 6. Here again it is considered good practice and more economical to joint the face stones all like the upper plan of Fig. 5 and the lower plan of Fig. 6, and thus save back-checking.

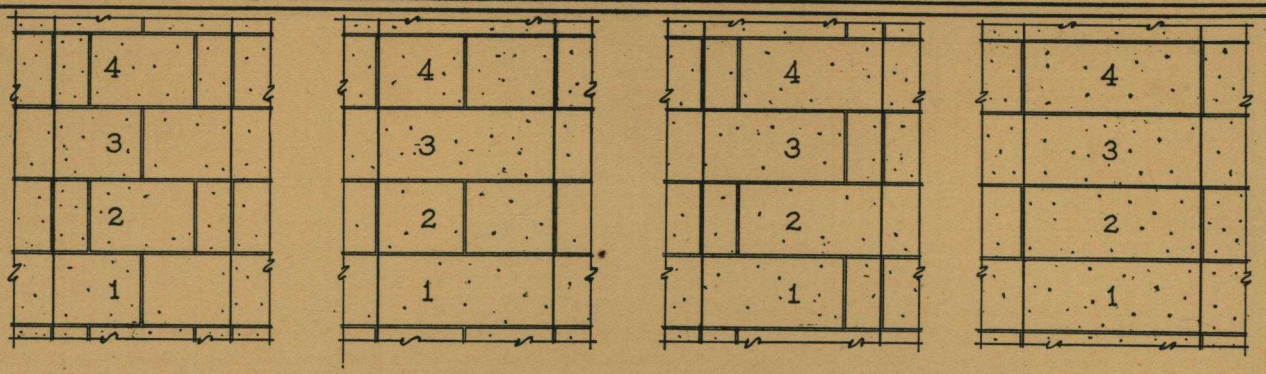
Fig. 7 shows two ways of jointing a very flat pier; the dotted lines indicate the bond of every second or third course; or one course may be jointed like one of the plans and one like the other. The omission of the check is more economical. Where the load is carried by the solid masonry walls and the piers themselves, and not by columns built in, it is generally required that the pier stones be bonded every second or third course, usually with a 4-inch greater depth in the wall, if the stone is to be counted as part of the total wall thickness. Many Building Codes require more bond than is necessary.

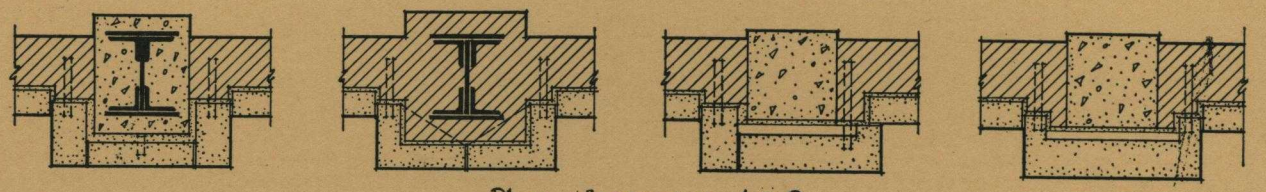
Should there be sufficient clearance, stones for such places as Courses 2 and 4 in Pier 2 may be cut diagonally across the back as shown by the dotted lines on the plan for that course. These stones are cut as shown in plan on Fig. 8 so that there is a minimum of waste and no back-checking.

Anchors of 1″x3-16″ steel are large enough in most cases, lying in grooves cut in the top bed of the stone. The ends should turn down 1″ in the stone and up 2″ in the backing and they should extend into the stone half its width, (or 4″ if the stone is over 8″ wide), and 8″ into the backing. Anchors made of round or square steel rod, $\frac{3}{8}$″ or more in diameter, are very suitable for piers and for holding stone to stone elsewhere; the hole in the stone is simply drilled in without the additional cutting required to receive a flat section.

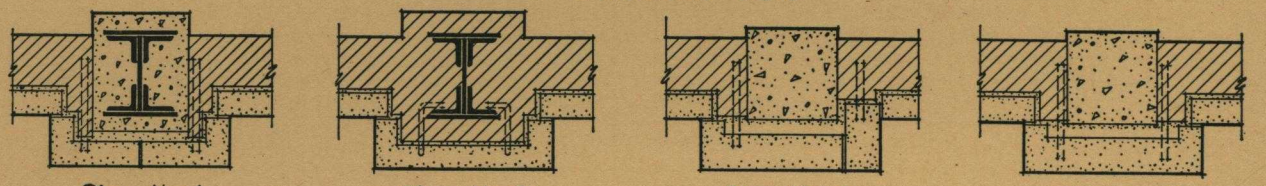
Although frequently done, it is sometimes inconvenient to build anchors into concrete columns or beams, as shown in the lower plan of Fig. 6, especially if the space is cramped, so it is more customary to anchor to the wall if sufficient security can be obtained in that way. Various suggestions for anchorage are shown on the drawings.

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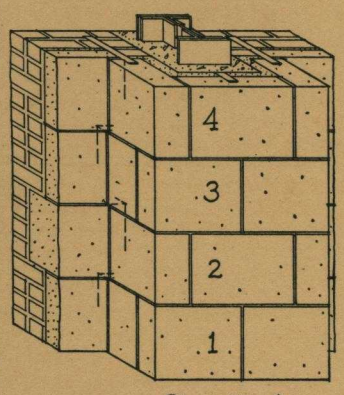
Plan of courses 1 & 3



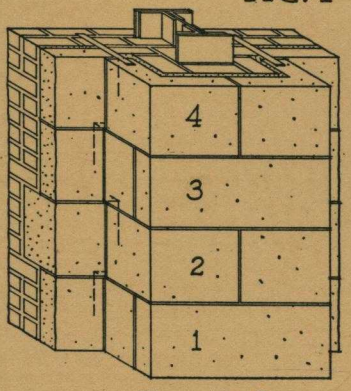
Pier No. 1 Pier No. 2 Pier No. 3 Pier No. 4

Plan of courses 2 & 4

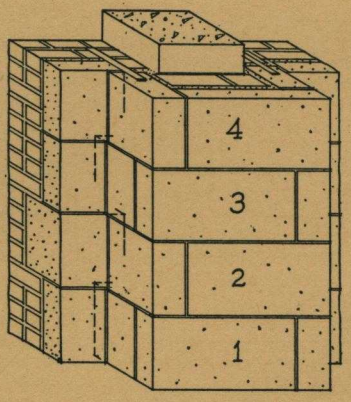
FIG. 1



Pier No. 1



Pier No. 2



Pier No. 3

FIG. 2

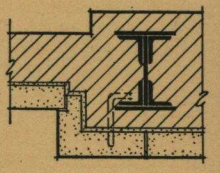


FIG. 3

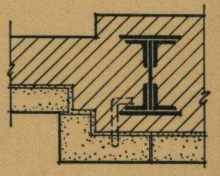
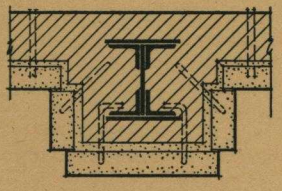


FIG. 4



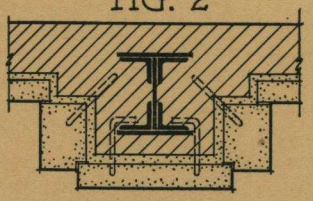


FIG. 5 FIG. 6

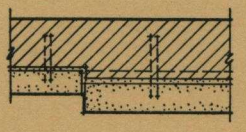


FIG. 7

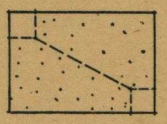


FIG. 8

DETAILS OF PIERS	TYPICAL INDIANA LIMESTONE DETAILS SERIES - D4-17 APRIL 1925	DRAWING NO. 21

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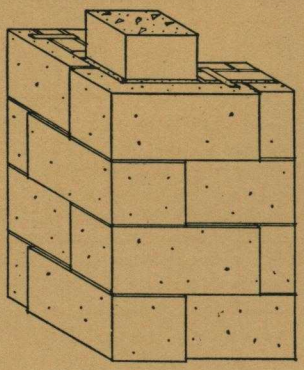


FIG. 1

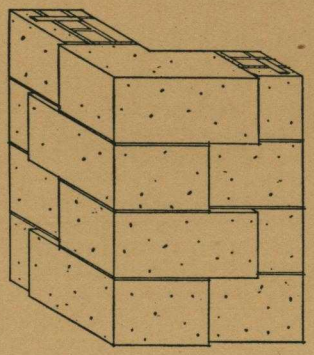


FIG. 2

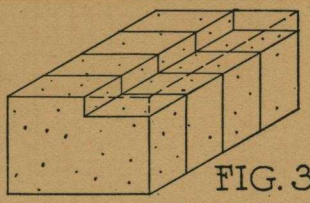


FIG. 3

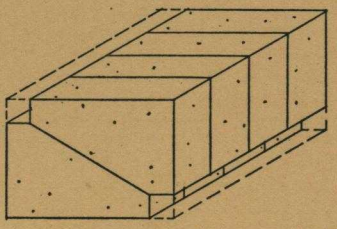


FIG. 4

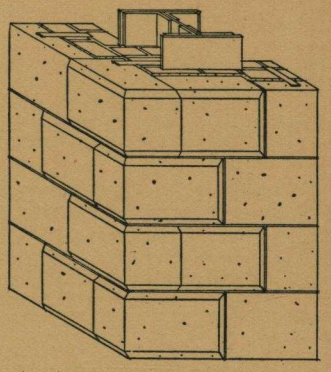


FIG. 5

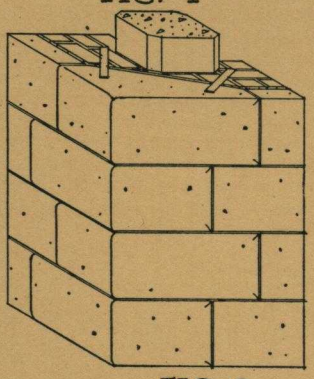


FIG. 6

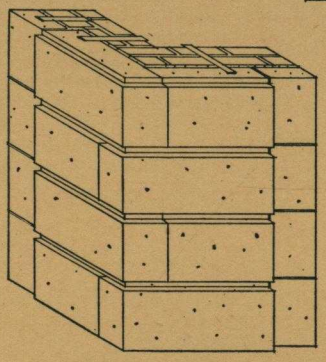


FIG. 7

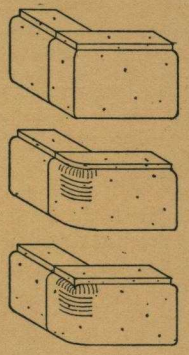


FIG. 8

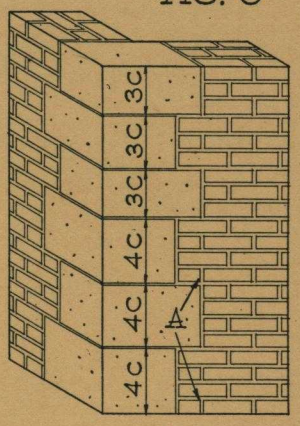


FIG. 9

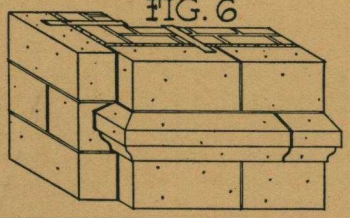


FIG. 10

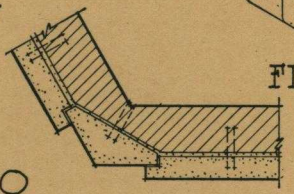


FIG. 11

DRAWING NO. 22
QUOINS

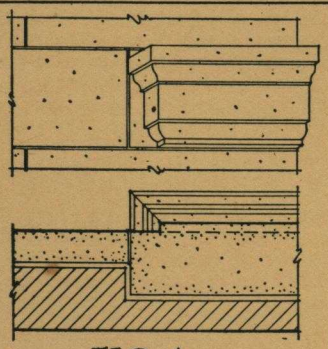


FIG. 1

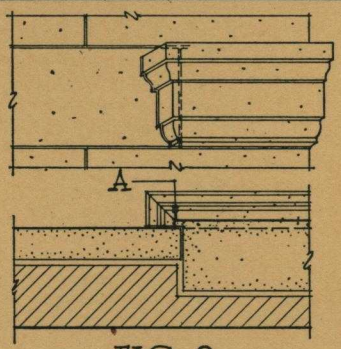


FIG. 2

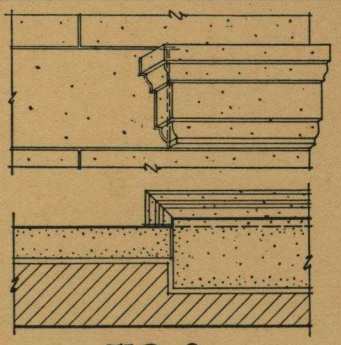


FIG. 3

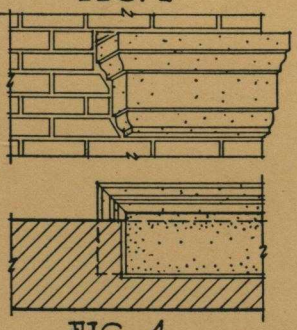


FIG. 4

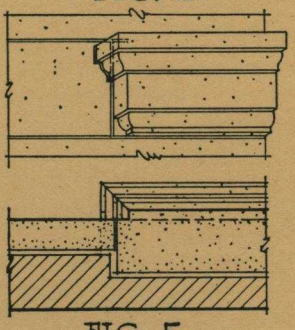


FIG. 5

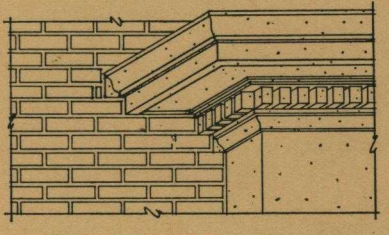


FIG. 6

DRAWING NO. 23
ASHLAR STOPS

QUOINS DRAWING NO. 22	TYPICAL INDIANA LIMESTONE DETAILS SERIES – D 4-18 & 19 APRIL 1925	ASHLAR STOPS DRAWING NO. 23

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THE DETAILING OF QUOINS

DRAWING NO. 22

Quoins do not present many problems, especially if they do not have to clear structural members or, if very large, do not have to be checked out at the back so as not to exceed the wall thickness, as in Fig. 1.

Cutting out a square from the back seldom saves a piece large enough to be worth the cost of the operation. In cases where there are many quoins of the same size, the back-cutting may be made in a long strip of stone which will then be sliced off to the required quoin heights, as in Fig. 3. A rectangular strip may be cut as shown in Fig. 4 to avoid the back-checking necessary to clear a column; such a quoin is seen in position in Fig. 6.

Quoins may be set flush with the wall, or projected slightly beyond it; on rare occasions they are set in a little from the wall face. The Architect should not fail to indicate clearly whether the overall dimensions are measured from the face of the quoin or from the normal wall face.

Projecting quoins may have their edges square, (Fig. 4), chamfered, (Fig. 5), rounded, (Fig.6), rusticated, (Fig. 7), or treated otherwise according to the taste of the designer. Note that there are several different kinds of rounded edges in quoins, and the architect should take care to show exactly which one he desires, (Fig. 8). A comparatively slight projection will give sufficient shadow to mark the quoins very definitely.

Where stone quoins are built in face brickwork, one is usually made half a brick (or multiples of half a brick) longer than the other in order that the bond of the brickwork can easily be maintained without clipping, (Fig. 9). The joints in the brickwork work out a little more neatly if the quoins are an odd number of brick courses in height (note joints at A) but, in spite of this, the general custom in ordinary work is to make the quoins four courses high. This is probably because the desired length of the quoin is in better proportion to a height of four courses.

Quoins may be made all of the same length. Then they partake more of the nature of a corner pier or pilaster, (Fig. 7).

Although hardly to be considered as any system of quoining, reference is made here to the set-back which is often given at the corners of a building, as illustrated in Fig. 10. This is often done purely for the sake of marking the corner. It is also a convenient place against which to return the mouldings of belt courses or cornices when to carry them around the corner is not desired or is not possible on account of overhanging the property line at the sides. If the corners of the lot are not right angles, this is a very convenient place to make up the difference. This is shown in plan in Fig. 11, which also indicates how it may be bonded.

THE DETAILING OF ASHLAR STOPS

DRAWING NO. 23

Where mouldings return against the wall to the solid block from which they are wrought, the flat block thus left exposed is called a wall stone, a wall stop or an ashlar stop, (Fig. 1).

By the old method of hand cutting it cost less to cut the mouldings back only as far as required, and ashlar stops therefore represented the most economical treatment.

By machine cutting it is simpler to back-check the stone at the wall line than to dress it to a flat surface, and the adjacent piece of ashlar is slipped behind the moulding, (Fig. 2). Although very common, this makes a joint apt to catch water running down over the face of the wall. The bottom member of the moulding often has only a very slight projection and is further weakened when the thickness of a joint is taken out, (A, Fig. 2); it is usually possible to overcome this difficulty by shifting the joint a little to miss this member, as in Fig. 3.

Another convenient method is to run the return mouldings right through without back-checking, and cope the stone or brick around them. It is not always easy to give a good appearance to such a joint, especially with a material like brick, which is hard to cut, (Fig. 4). This treatment is seldom seen where stone comes against stone, even in work which is not quite first class.

In these two last described methods, the assumption is that the return is of considerable length, such as might be found at the ends of a cornice. If short, it is cut by hand in preference to setting the stone up in the planer or the header.

With stone ashlar adjoining the moulded work, not much difference in appearance is noticeable between Fig. 1 and Fig. 2. With brickwork of a contrasting color and texture the effect is considerably altered by the treatment; there the wall stop gives a greater appearance of solidity, while its absence shows better the contour of the mouldings. The Architect must choose which he considers more desirable.

Sometimes a combination of the two methods is employed, as in Fig. 5, where the ashlar is shown tailing in behind the top of the moulded course, but with the wall stone left showing at the bottom; or the wall stone is cut to the least possible width at every brick level, the mouldings being detailed to fit the courses, as in Fig. 6. This last method is not often done except where the stone is several brick courses high and where the projection of the mouldings is considerable.

From the standpoint of the cut stone contractor, the detail as shown in Fig. 2 or Fig. 3 is preferable, and if the architect's scale drawings show this, recognition will be taken of it if there is any considerable amount of such cutting to be done. On the other hand, if the architect desires the stop as shown in Fig. 1, he should so indicate it, for the estimator, in making up his competitive bid, will naturally figure on the least amount of cutting specified.

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DETAILS *and* DATA SHEET NUMBER 12

April, 1925

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*

INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

THE DETAILING OF WINDOW SILLS

DRAWING NO. 24

THE cheapest type of stone sill is made by simply tilting a strip to form the wash, (Fig. 1).

This is much improved by using strips with the face cut a little less than 90° to the bed, (Fig. 2), and, if the slab is sliced off into sills, the back will be parallel to the front, as shown by the dotted line. With not too much wash, this is satisfactory enough in inexpensive work. With too much tilt the brick resting on the sill cannot be bedded down to its line; if the brickwork is to be stuccoed, this makes no difference. Such a sill frequently has no cut drip, the tilt being considered sufficient.

Fig. 3 is a simple form of the best window sill design, with lugs, drip, groove for water bar, and cut wash. The wash should have a minimum slope of $\frac{3}{8}''$ for a 4″ reveal; more than this is preferable, but too much involves a greater expense for cutting, which must be taken into account when the slope is 2″ or more to the foot. The drip should be ample for its purpose, which is to shed water that has streamed down over the window; it can not be expected to shed it all, for any strong breeze will easily blow the dripping water across the gap. In ordinary work, the projection of the sill is $1\frac{1}{2}''$, the distance back to the drip being $\frac{3}{4}''$; the height of the drip $\frac{3}{8}''$ to $\frac{1}{2}''$. If the back line of the drip is made flush with the wall line, one less edge is left where the water can collect; incidentally, where there is nothing on the top bed to indicate the projection of the stone, the drip line will give it. Drips are properly not cut through the whole length of the sill but are stopped the same distance from the end as they are set back from the face, (Fig. 4).

In some classes of work the sills are flush with the wall, and the stone or brickwork below the sill is almost sure to be discolored by dirty water washing down over the window. Sometimes there is no objection to this, but if a drip is desired it will be necessary to use a piece of metal bent to a slightly obtuse angle, one leg being built into the bed under the sill and the other projecting out and down to form the drip. The built-in side should be 2″ or more in width and the other 1″ or $1\frac{1}{2}''$; and the bending should be such that the bottom edge is $\frac{1}{2}''$ or $\frac{3}{4}''$ out from the wall, (Fig. 5). These strips are best made of hard lead so that they will not rust or stain. Of course they do not enhance the appearance of the building, especially if they become bent out of shape.

In good work the wash is usually rounded up at its back where it meets the wood sill. It frequently extends under it about $\frac{1}{4}''$, although the advantage of this is problematical, for the pocket will collect dust which will take up water and tend to rot the wood sill, (Fig. 6).

The groove for the water-bar is about 5-16″, the width of a saw cut, and $\frac{5}{8}''$ deep. It should be kept $\frac{3}{4}''$ or 1″ from the back of the sill to prevent the edge behind it from being broken off in handling, (Fig. 7). This makes the minimum thickness for such a sill about $7\frac{1}{2}''$. On work as inexpensive as that shown at Fig. 1 and Fig. 2, a water-bar is seldom seen.

The material for the water-bar itself is usually a strip of iron. This should be galvanized or dipped, but even then there is the sure knowledge that if water gets in, the protective coating will eventually disappear and rust stains may appear. As no strain comes on the water-bar and care need be taken only while setting the frame, it may be of quite light metal. Hard lead or brass do not rust. The groove should be filled with mastic cement or even mortar of lime or stainless cement, and the water-bar pressed into it just before setting the frame.

Care should be taken in indicating the position of the water-bar. In detailing the sill, the reveal is measured back from the wall face and thus the position of the water-bar is found for the stone cutter. In detailing the frame and interior trim, the measurements are likely worked outwards from the plaster line. If the Architect has assumed a wall thickness of 12″, which in execution is actually $11\frac{3}{4}''$ or $12\frac{1}{4}''$, the grooves in the stone sill and the wood sill will not match. It is always better to take all measurements from the outer face of the wall, as work on the stone is required to be begun much earlier than on the woodwork, and thus more time can be allowed for determining the exact wall thickness; not only that, but the inside plaster can be varied a little to make up slight differences.

The lugs on an ordinary common window sill are usually made to extend 4″ into the wall at either side of the opening, (Fig. 8). In brickwork this is usually done to bond with a half brick. Two inches long is often quite enough for appearance and is preferred by some Architects on the principle that it is less liable to shear with settlement or other movement in the walls. Where the lug meets the wash, it may be cut down, as shown in elevation in Fig. 8 and in section in Fig. 3 or Fig. 6, or left square as in Fig. 7 and Fig. 9.

Moulded sills, with the mouldings returning back to the wall face, must have the lugs at least as long as is the projection of the sill from the wall line, (Fig. 12). It is neither usual nor beneficial to provide a flat seat to receive the bottom of the hanging style, although this is sometimes done, (Figs. 10 and 11).

In setting lug sills, the bed is made under the ends only. Settlement of the building puts weight on the ends and not in the middle of the sill and a crack is apt to develop if the bed is continuous. Most of the settlement has taken place by the time the walls are cleaned down and pointed, and it is customary then to point under the whole length of the sill.

It is somewhat easier to continue the slope of the wash of a sill right through, (Fig. 10), than to change it for every change in width, as in Fig. 11.

Slip sills have no lugs and simply fill the space between the jambs. They are used to some considerable extent in factory work, partly because of their lower cost and partly for reasons of construction. Where a lug sill that is divided into two or more lengths might be thrown out of level when settlement of the wall exerts pressure on the built-in end, a slip sill is not affected.

Slip sills, (Fig. 13), are objectionable because the water runs down the face of the window and into the joint, eventually washing out the mortar. For similar reasons it is well to have no more joints in sills than necessary. Raised joints help very little, are easily broken during and after construction, and are always unsightly.

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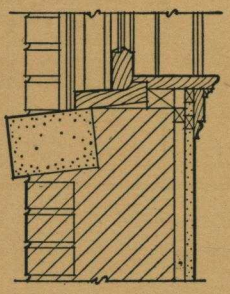


FIG. 1

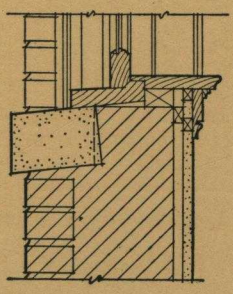


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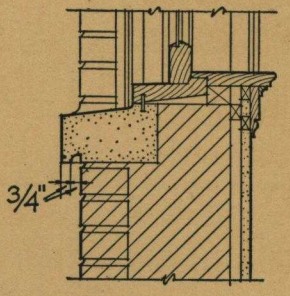


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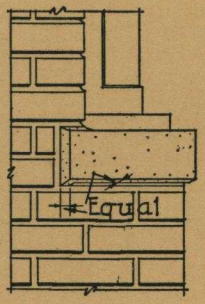


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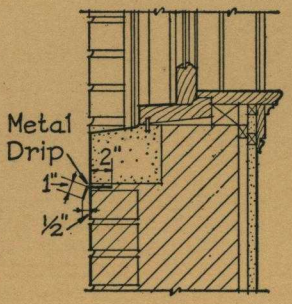


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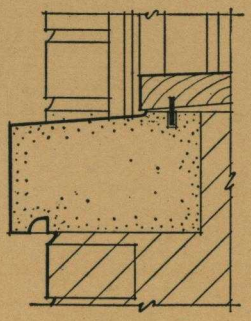


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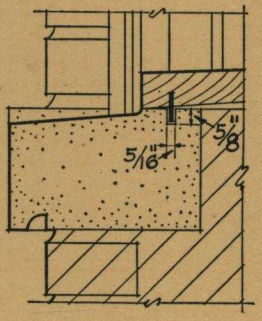


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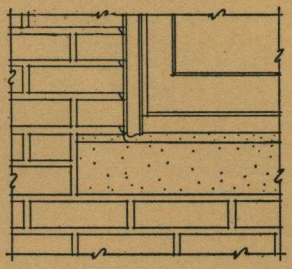


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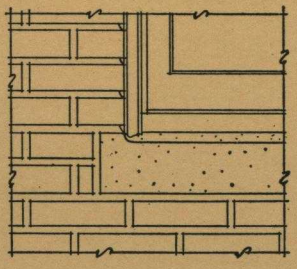


FIG. 9

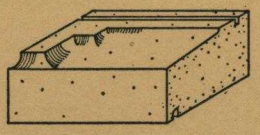


FIG. 10

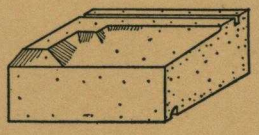


FIG. 11

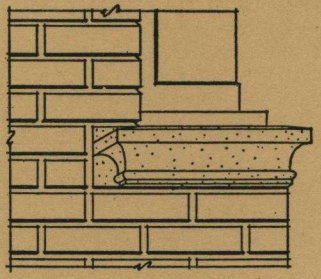


FIG. 12

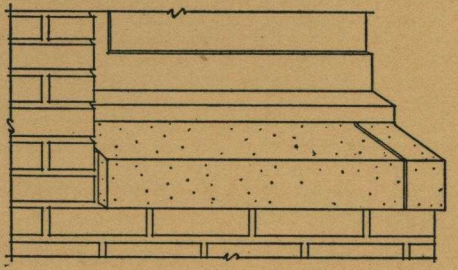


FIG 13

DETAILS OF WINDOW SILLS	TYPICAL INDIANA LIMESTONE DETAILS SERIES ~ D 4 ~ 20 APRIL 1925	DRAWING NO. 24

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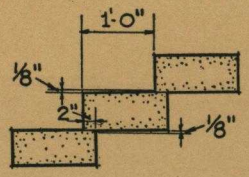


FIG. 1

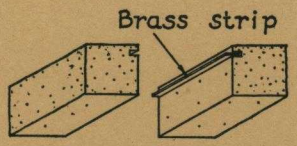
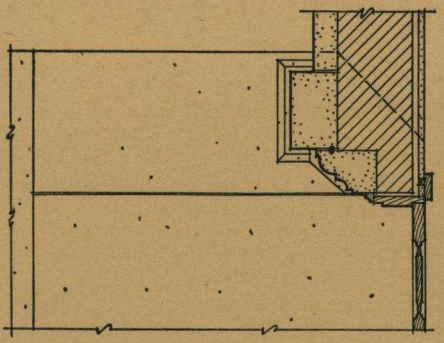
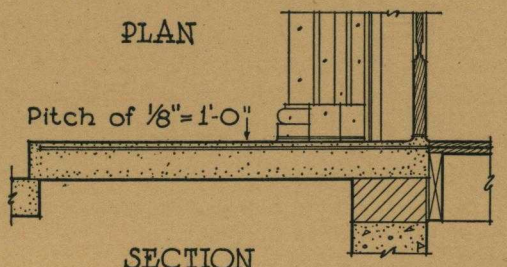


FIG. 4



PLAN



SECTION

FIG. 3

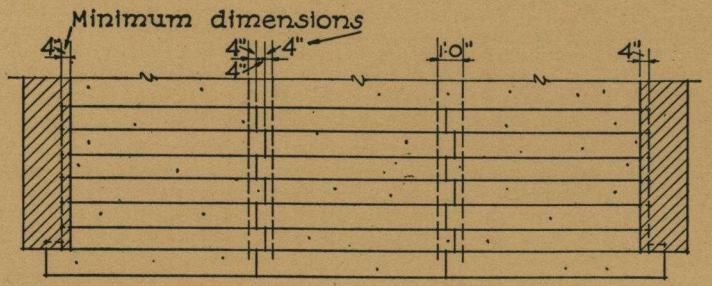


FIG. 2

DRAWING NO. 25
STEPS & PLATFORMS

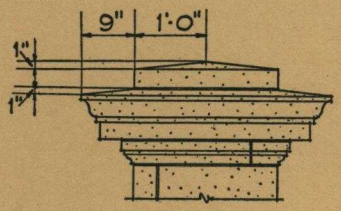


FIG. 1

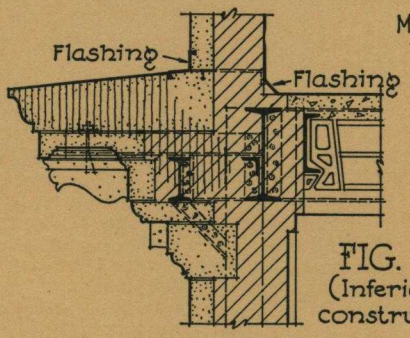


FIG. 2
(Inferior construction)

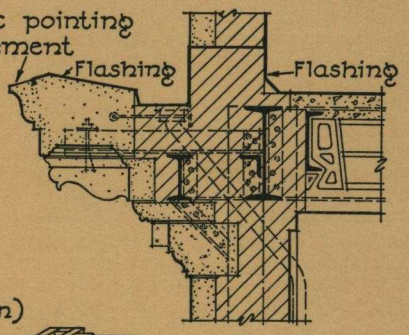


FIG. 3
(Good construction)

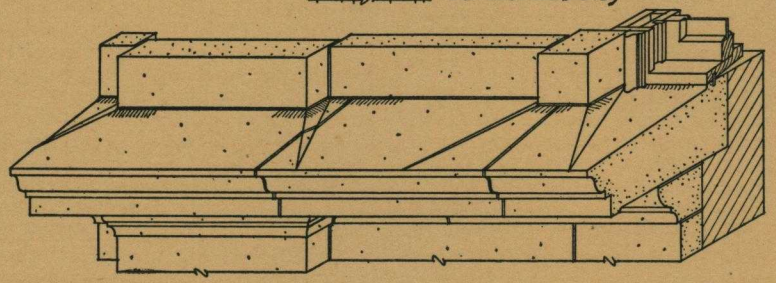


FIG. 4

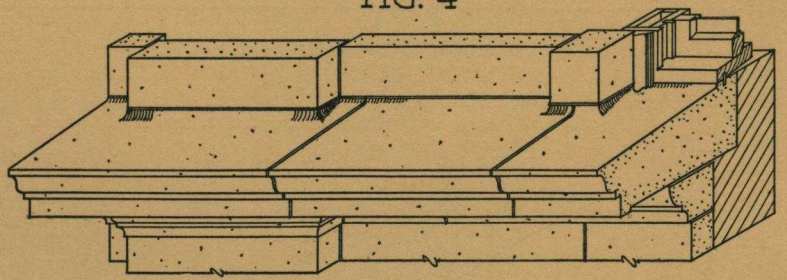


FIG. 5

DRAWING NO. 26
WASHES

STEPS & PLATFORMS DRAWING NO. 25

TYPICAL INDIANA LIMESTONE DETAILS
SERIES - D 4-21 & 22 APRIL 1925

WASHES DRAWING NO. 26

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THE DETAILING OF STEPS AND PLATFORMS

DRAWING NO. 25

Although not generally classified among the hard stones, Indiana Limestone is very satisfactory for steps and platforms if special hard stock is specified.

Steps are not usually set with as much wash as window sills, and one-eighth of an inch to the foot is customary. More than this would make them too dangerous if slippery from ice or snow. With this small slope, they are usually tilted instead of being cut to an angle, (Fig. 1).

A bed of two inches should be given to carry the step above, (Fig. 1).

In designing the foundation for steps where great length makes it necessary to joint them, the supporting wall should be at least 12″ thick so as to give a 4″ bearing and to break the joints 4″, (Fig. 2).

It is not customary to have projecting nosings on stone steps. Usually the tread is greater and the rise less than in wooden ones, and the nosing is not required. It adds to the cost also.

Platforms and landings can be made in almost any size. The limitation is not in the stone but in the facilities for handling it, both in shipment and at the site, especially when there is such a large area and such a small thickness.

As large slabs frequently have to be ordered from the quarry, particularly if of special hard stock, ample notice of the exact dimensions required should be given the stone contractor.

In detailing a large entrance platform, with a deep reveal and many seats required for the jambs, it is easier on the stone contractor to have as much as possible of the cutting done on one or two stones, leaving the others with little or none, (Fig. 3). This can be accomplished by making the middle pieces like slip sills, and it has the extra advantage that this middle stone can be set later, giving it time to be brought from the quarry and saving it from rough treatment while material is being taken into the building. It is always well to take up such points with the cut stone contractor.

As the basement under such a platform is often used for storage space, it is important that water does not get through the joint. A narrow groove (such as a saw-cut) about half an inch deep is cut into the end joints of the stones, parallel with the bed and an inch or two down from the top. When the stone is set, a flat strip of brass is pushed into this groove from the back, and the joint is pointed with mastic caulking cement. The strip is shown in position in Fig. 3 and at larger scale in Fig. 4.

THE DETAILING OF WASHES ON HORIZONTAL SURFACES

DRAWING NO. 26

The less opportunity for water to lie on any part of a building the better. Under ordinary conditions, water does not penetrate stone to any appreciable extent, but it catches dust and soot from the air and leaves the stone dirty.

Flat, horizontal surfaces of stone should be avoided whenever possible. A one-piece flat stone, such as the cap on a die, usually stands clear of the wall and not where water from some projection higher up will drip on it. Even then, a slight wash would be better.

A slope of one inch to the foot is usually ample, (Fig. 1). Places subject to much water flowing over them should have more, but the wash on door sills and steps must not be greater than about ⅛″ to the foot or they will be unsafe.

As few joints as possible should be made in horizontal surfaces. Even with every precaution taken it is not easy to make joints water-tight, and moisture seeping through may cause damage. If it remains in the joints it is liable to freeze, with the probability of the pointing mortar falling out and the danger of splitting off of some of the stone or whatever material composes the cornice. When the mortar drops out, the way is left open for much more water to get in. In a cornice supported by steel, the water rusts the metal, and the whole thing may come down when erosion has progressed far enough, (Fig. 2). Fig. 3 is first-class construction and requires less stone.

Raised joints and roll joints, besides being unsightly, are not of great value. Water is almost sure to lodge in the joint—the very place where it can do most damage. There it freezes, with the consequent splitting off of the thin shoulder.

Few joints, a smooth surface, sufficient slope and good pointing are what give the best results. Indiana Limestone has a great advantage in that it is easily procurable in long lengths and requires few joints.

When there are many breaks in plan, much unnecessary trouble may be saved by the way in which the wash is detailed. The top bed and the edge of the top member both being level, each different projection requires a different slope. Each change means shifting the tool in the planer and probably some hand cutting. These different slopes meet on a mitre line, with hips and valleys. Often the jointing scheme requires a joint through them, which involves very careful fitting at the mill and on the building, (Fig. 4).

Instead of all this, it is better to cut to the flattest wash throughout, stopping it where required by the position of the wall, and cutting down to it from the top bed, either vertically or with a cove moulding, (Fig. 5).

Exposed horizontal joints should be carefully pointed. A good mastic caulking cement that will adhere tenaciously to the stone is the best material to use. Inferior pointing usually first reveals itself in the projecting courses and careful superintendence at this stage is important.

Needless to say, a good drip should be provided as high up as conveniently possible under all projections.

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A. I. A. Classification No. 8 by 2

Indiana Limestone Service Publication
Series D4
Drawings 27 and 28

BUILD THE NATION SECURELY WITH
INDIANA LIMESTONE
The NATION'S BUILDING STONE

DETAILS *and* DATA SHEET NUMBER 13
February, 1926

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

INDIANA LIMESTONE CORNICES APPLIED TO REINFORCED CONCRETE CONSTRUCTION

DETAILS OF CORNICES IN THE ROMAN DORIC AND THE ROMAN IONIC ORDERS

ALTHOUGH the trend of present day design is towards a reduction in size and even the elimination of cornices, this feature is seen on a great many new buildings and is by no means obsolete.

The details of the two cornices shown herein are for reinforced concrete-frame buildings. While every building has its own problems, affecting the position and size of the columns and beams, those illustrated are fairly typical of the usual conditions. The principle can be followed even if the details of construction require considerable alteration in their adaptation for the particular building.

The architect is strongly advised to study the details of the framing and of the facing at the same time so that it will not be discovered too late that very slight changes in the shape or position of the concrete beams would have made the cutting or the setting of the stone considerably easier. The careful designer notices all these points, with the result that the cost of the building is lower and the owner is better satisfied.

In detailing a cornice, the construction and jointing should be very carefully considered so that the use of unnecessary material, much stone-cutting and complicated setting are avoided. In a district where the freight rate is low and there is perhaps no steel-frame construction on the building, it may be more economical to let a projecting stone extend through the wall to balance itself instead of giving it the minimum wall bearing and bracketing out to support it, but this practice, on account of the weight that it places on the supporting frame, is not usual in skeleton-frame building construction. Sometimes it may seem to the detailer that by introducing a horizontal joint he can save material by cutting off the back of one course so that it has less depth in the wall than the one below it, whereas it would actually cost less to use the extra stock and save cutting the two beds. The most obvious method is not always the best.

A good cut stone contractor can usually give excellent advice on points like these and is always willing to do so without attempting to place the architect under obligation. This Association, through its Field Representatives or at its Head Office at Bedford, is always ready to assist in solving any problems of this kind.

Clauses to cover the proper flashing of projecting courses should be included in the specification for sheet metal work requiring the copper flashing to be tucked well into the raglet, secured by soft lead wedges and well pointed so as to be watertight.

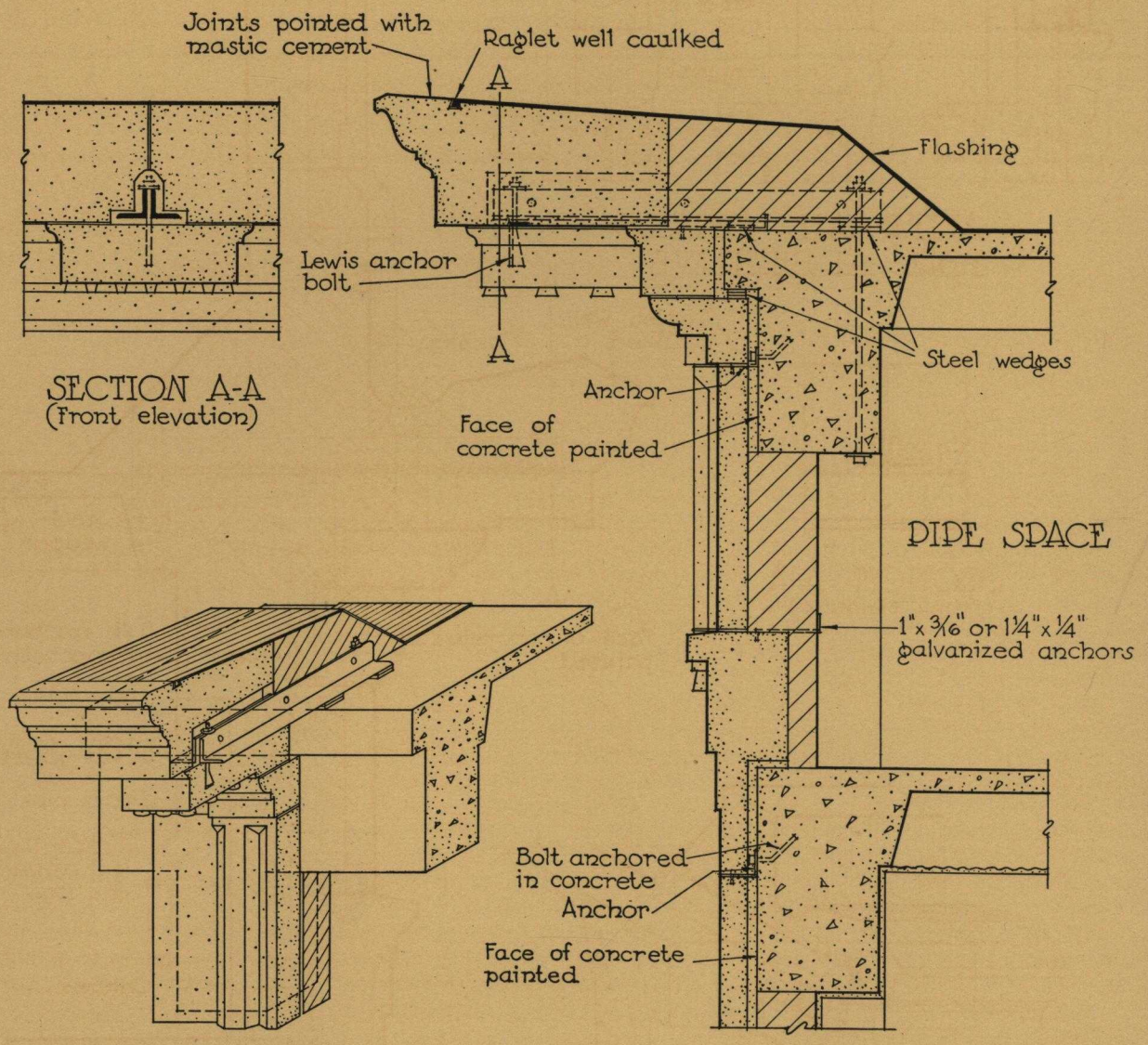
On account of the staining action of ordinary cement on light-colored stone, concrete which comes near the stone should be heavily coated with a good asphaltic waterproofing compound. It was formerly the custom to specify that the back of the stone should be painted, but applying this coating to the concrete is the better method. Brick backing should have its first tier against the stone laid in lime or non-staining cement mortar, the same as that used for setting the stone.

There is little danger of staining if the wall is kept dry during construction, which may be attained by protecting the top and back of it from rain or snow and from water flowing out of concrete forms or the wash from floor slabs during construction, and then flashing it carefully so that no moisture can penetrate through exposed joints, or from the exposed brickwork in the back of parapet walls. When cornices show discoloration, while none is seen elsewhere on the building, the inference can only be that adequate protection has not been provided.

Steel and concrete have about the same coefficient of expansion, and this is considerably greater than that of Indiana Limestone. It is well to allow plenty of clearance between the stone and the structural frame to allow for temperature changes. The height of a cornice is not often more than a few feet and the difference in expansion is not great enough to require that it be provided for in the detailing of cornice members.

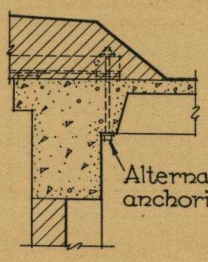
For further description and reference to the different detail sections shown on plate drawings Nos. 27 and 28, see last page.

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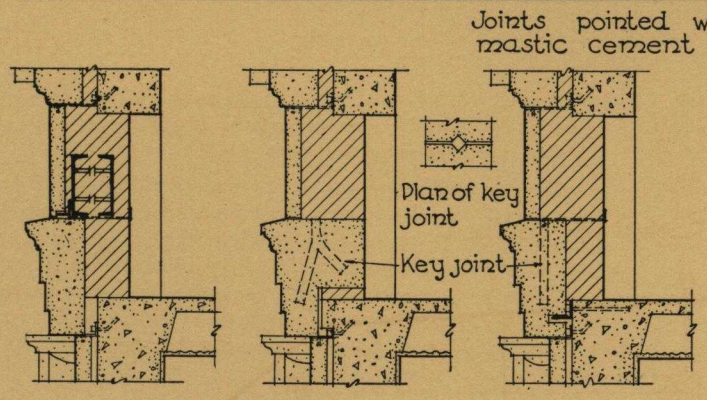
SECTION A-A
(Front elevation)

ISOMETRIC VIEW
SHOWING CONSTRUCTION

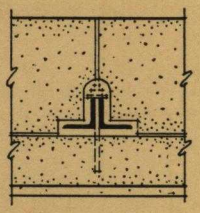


SCALE 0 3" 6" 9" 12" 18" DATE ~ APRIL ~ 1926	DETAILS OF INDIANA LIMESTONE CORNICES ROMAN DORIC ORDER~REINF. CONCRETE CONSTR.	DRAWING NO. 27 SERIES D4 - 23

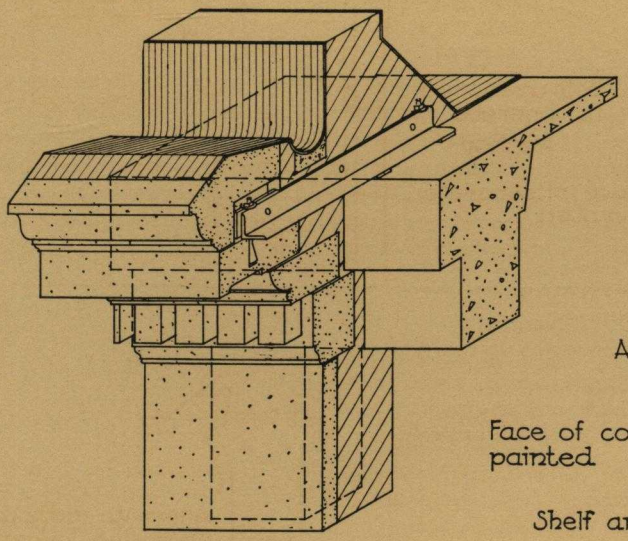
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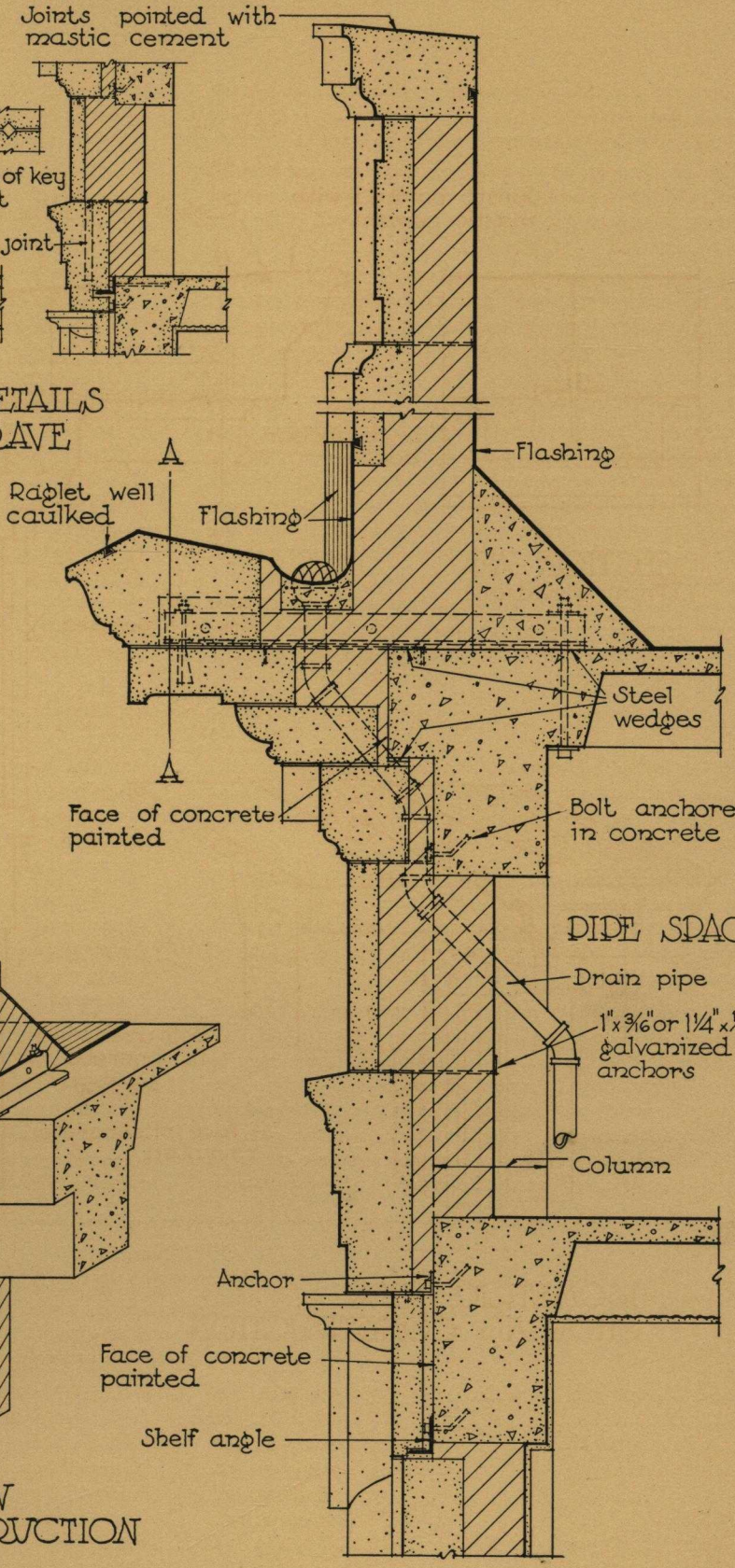
ALTERNATE DETAILS FOR ARCHITRAVE



SECTION A-A
(Front elevation)



ISOMETRIC VIEW SHOWING CONSTRUCTION



SCALE 0" 3" 6" 9" 12" 18" DATE - APRIL - 1926	DETAILS OF INDIANA LIMESTONE CORNICES ROMAN IONIC ORDER~REINF. CONCRETE CONSTR.	DRAWING NO. 28 SERIES D4 - 24

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DRAWING No. 27, ROMAN DORIC CORNICE

The illustration shows the simple method of construction. This order has a cornice with considerable projection but with very little corbelling in the lower courses to carry it.

The floor lines are shown so as to give a pipe space beneath the roof. By exaggerating the height of the frieze and putting windows in it, another full-height story can be made of the pipe space.

A shoulder on the upper concrete beam provides for wedging down the dentil course and also gives a bearing near the face of the wall to carry the double angle-iron which supports the projecting mutules by lewis anchors and also carries the top member of the cornice.

Because of the projection of the cornice and the lack of a parapet to weight down the inner ends of the angle-iron lookouts, the bolt holding them in place should be as far back as possible. Although shown in its usual position through the entire depth of the beam, these bolts might well be moved back so as to go through the roof construction as shown in the small scale section, thus getting more leverage, using a shorter bolt and not interfering with the reinforcing steel of the beam. If the under side of the roof is to be used as a ceiling to a finished room, the concrete would simply have to be checked out to receive the bolt head so that it would not show from beneath. Many building codes require that a parapet be built, in which case its weight will be a great help in holding down the lookouts which support the projecting stone work.

As the modillions must be set exactly in the right place, the bolt holes for the lookouts must be correctly spaced on the concrete forms following a drawing supplied by the cut stone contractor. Such holes should be large enough to provide some leeway; also the check in the top course of stone to receive the angle-iron may be made a little wider to permit of some adjustment. The cut stone contractor will always furnish shop drawings on which the exact spacing is shown.

The stones in the top course should have their joints particularly well made. The end joints should be filled with grout of non-staining cement. The copper flashing should extend well over the top of the stone to near the outer edge; and should be carefully wedged and caulked in the raglet. The remaining portion of the joints still exposed on the top of the stone should be pointed with elastic caulking cement. It is very important that this is not neglected, for if water penetrates to the steel it will eventually cause it to rust away, and, even if the condition is not so serious as that, the face of the stone will be disfigured by dirty streaks from the moisture seepage through joints.

DRAWING No. 28, ROMAN IONIC CORNICE

No particular problems are found in detailing this cornice. The ashlar and the lower stones with their small projections are tied to and unified with the wall by means of anchors either running through the brickwork or bolted to the concrete beam.

The architrave is shown as one stone supported at its ends on the pilaster capitals. There should be no mortar in the bed except at the ends so that no unintended weight will be put on the ashlar below it; the open joint can be filled when the wall is cleaned and pointed.

If the distances between the pilasters is so great that a single stone spanning it will not carry the load, a different detail must be followed. A channel-and-angle beam may be built in to relieve the architrave of all but its own weight. The stone may be run through the wall so as to rest on the concrete beam. An angle may be bolted on the face of the concrete beam to support the architrave which has a groove cut in its back. Placing the angle at the bottom bed of the architrave would be simpler but it would project so far that its outer edge would be exposed. A deep V in the ends of each stone is cut to template so that it will be exactly in the right place. After the stone is set, this hole is filled with grout and forms a key which prevents the stone from slipping.

The dentil course is wedged down under a shoulder on the upper beam. This projecting part also affords better leverage for supporting the upper courses. The dentils are so close together that the stone above them has a bearing for its entire bottom bed.

The lookouts are bolted down through the concrete beam and support the top course, as shown in Section A-A, while Lewis anchors carry the stones in the course below.

The parapet wall weights down the lookouts so that they are very firm. Where there is no parapet or one of much lighter design, it might be better to bolt the inner end of them somewhat farther back in the ceiling where this is practical.

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Indiana Limestone Service Publication
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Drawings 29 and 30

BUILD THE NATION SECURELY WITH
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DETAILS *and* DATA SHEET NUMBER 14
February, 1926

Prepared and Published by ARCHITECTS' SERVICE DEPARTMENT *of the*
INDIANA LIMESTONE QUARRYMEN'S ASSOCIATION, BEDFORD, INDIANA

DETAILS OF INDIANA LIMESTONE CORNICES FOR REINFORCED CONCRETE-FRAME CONSTRUCTION

SHOWING TYPICAL COMPOSITE AND ITALIAN RENAISSANCE CORNICES JOINTE D ECONOMICALLY

REINFORCED concrete does not offer quite the same facilities for supporting a projecting cornice as are found on a steel-frame building. The members are so much larger that they cannot be made to occupy small spaces between stones, such as narrow ledges or projecting supports. It is often better to attach steel brackets to the concrete beams. This is simple, because they come to the building already fabricated and need only to be bolted in place.

With the passing of the great, heavily-ornamented cornice, except in some monumental work and in designs where heavy ornamental detail is depended upon to enrich and beautify the whole structure, and the more general use of orders that are only one or perhaps two stories in height, extreme projections are not often found in new work even in the tallest buildings. The mouldings are bold and simple, and fine carving is omitted, it being realized that this sort of decoration can not be appreciated at any considerable height. Incidentally this affects the cost to a noticeable degree and permits the use of more ornamental detail and decoration in portions of the building where it will show to much better advantage. The beautiful texture of Indiana Limestone, which permits of the most delicate carving and sharp arrises, and the ease with which it can be cut to the exact form desired, with the consequent uniformity of joints and surfaces, are a source of delight to the architect or the modeller who is desirous of having his ideas faithfully reproduced. He knows, moreover, that the work will be just as attractive in two, twenty or fifty years as it is on the day it is finished.

A contributing factor to economy in the cost of the finished work is the use of somewhat coarser grained varieties of stone in places where they are not subject to close inspection. At a comparatively short distance it is very difficult to distinguish between Select and Standard stock, and a little farther away these can hardly be told from the still coarser Rustic variety. For the high parts of a building the use of the finest grained stone is quite unnecessary; in fact many, architects consider that the coarser texture gives boldness to the detail and a more vibrant effect.

Emphasis can not be laid too frequently on the need of finishing the top of the wall so as to exclude moisture. Water allowed to penetrate through the brick backing of a parapet wall, even if it does not soak in so deeply as to discolor the ceiling, as it sometimes does, is sure eventually to cause rusting of unprotected steel work. Fortunately the thermal expansion coefficient of Indiana Limestone is comparatively low, which prevents the opening of joints because of changes in temperature, and the methods of construction persistently advocated by this Association, and followed by most architects, have resulted in work a failure of which is practically unknown.

The architect's drawings should show well-sloping washes on horizontal surfaces, and sufficient gutter accommodation to carry away water. The mixture of ice, snow and water, so often present when winter begins to "break," is particularly harmful, as it often piles up much higher than is usually expected, the water penetrating the joints where the proper precautions have not been taken to prevent this; freezing then causes trouble.

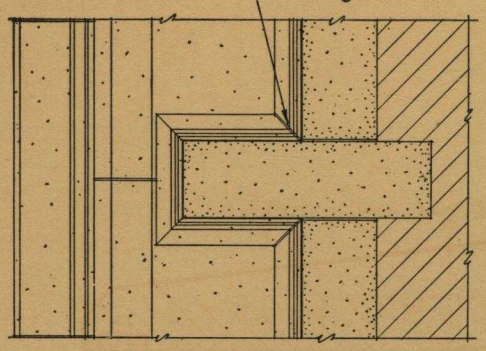
The drawings should also indicate as simple, yet safe, and direct a method of suspending and anchoring the stone as possible. Attention should be given to the corners, as problems requiring special attention often arise at these points. Where stone has to be slipped into place under steel or concrete previously erected, ample clearance should be allowed. It is no simple matter for a setter to guide a large stone into a crevice with not more than half-an-inch of clearance without destroying the mortar bed which he has just prepared for it.

The specification should provide for thorough flashing, for well-grouted joints and for careful pointing, calling for mastic cement in all exposed horizontal joints, where there is any liability to movement due to temperature changes.

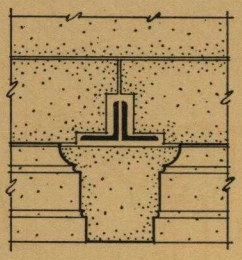
For further description and reference to the different detail sections shown on plate drawings Nos. 29 and 30, see last page.

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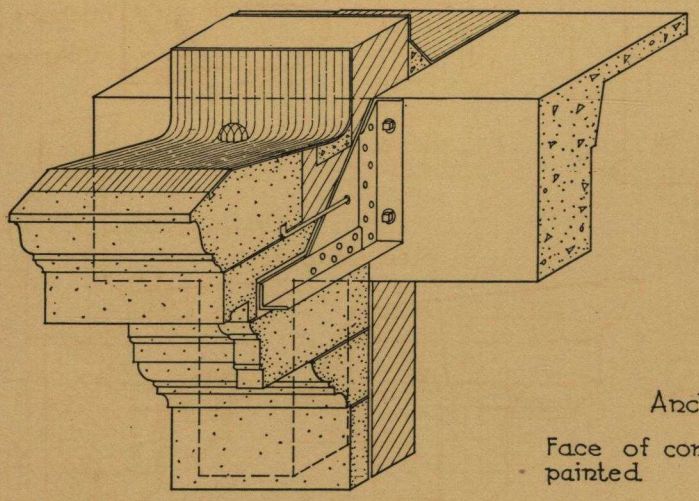
INDIANA LIMESTONE



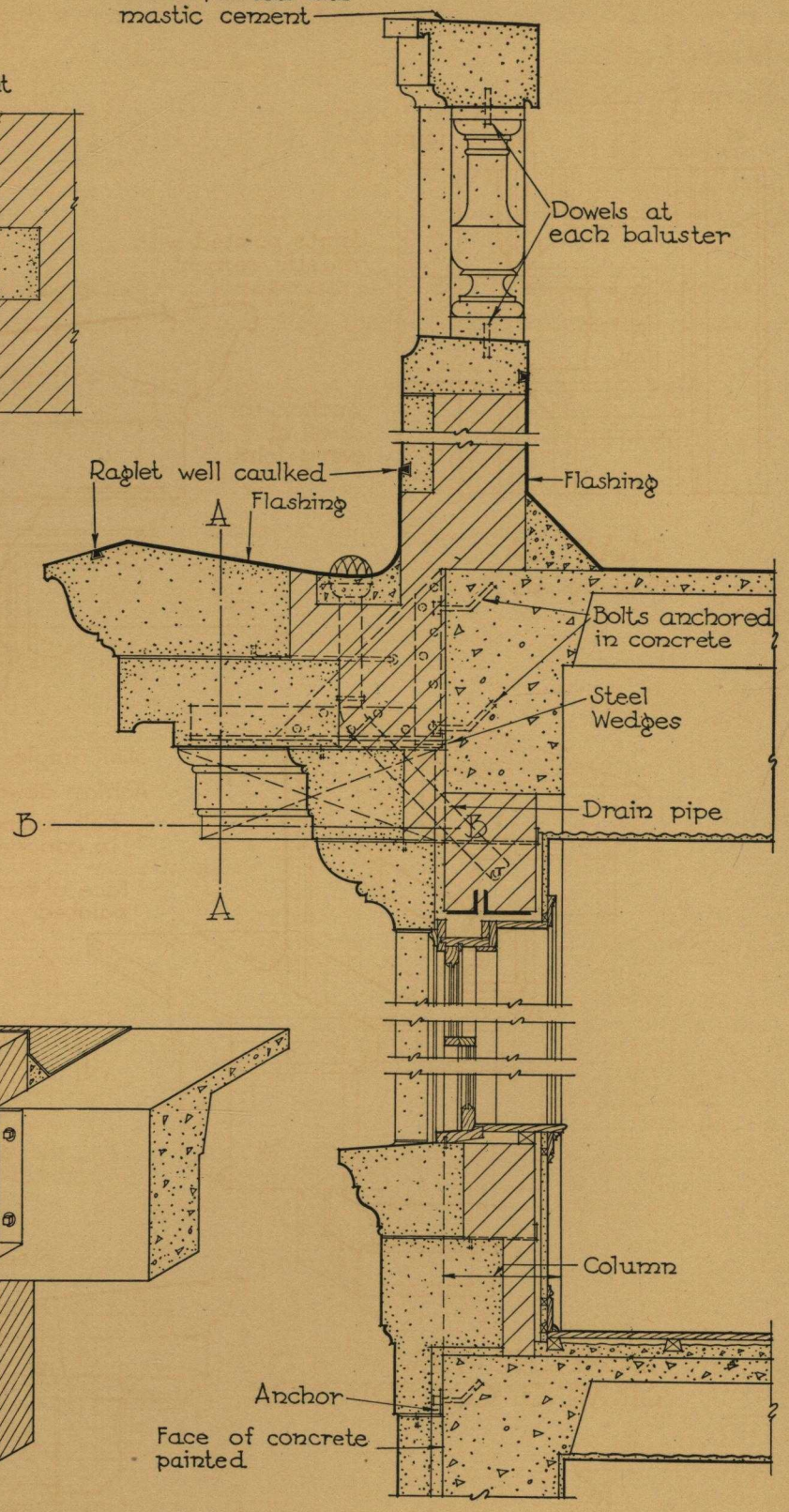
PLAN B-B
(Looking up)



SECTION A-A
(Front elevation)

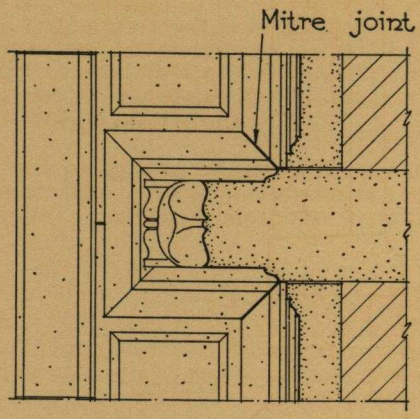


ISOMETRIC VIEW
SHOWING CONSTRUCTION
AT SECTION A-A

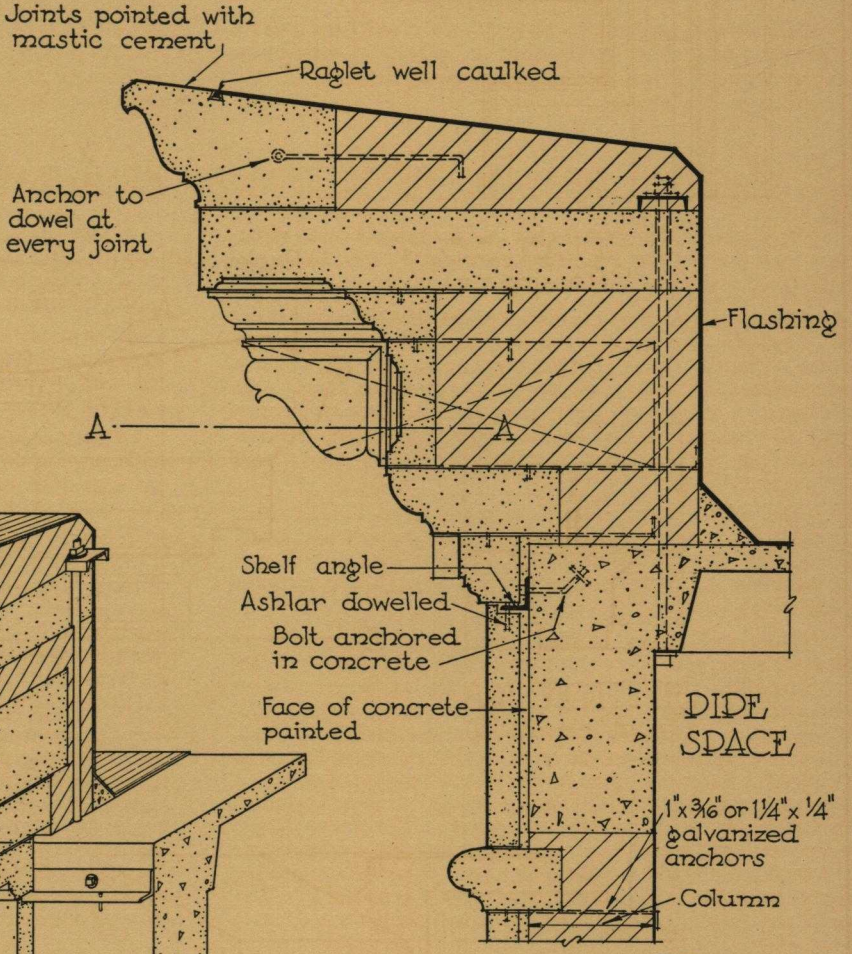


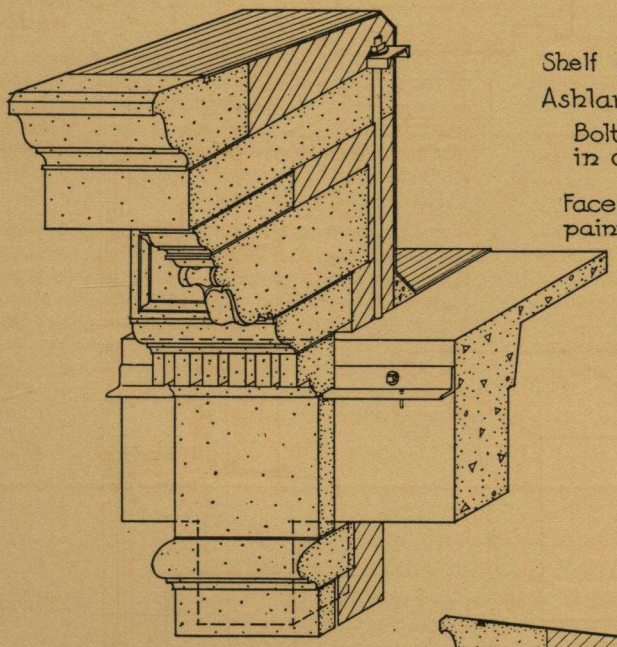
SCALE 0 3" 6" 9" 12" 18" DATE - APRIL - 1926	DETAILS OF INDIANA LIMESTONE CORNICES COMPOSITE ORDER ~ REINF. CONCRETE CONSTR.	DRAWING NO. 29 SERIES D 4 - 25

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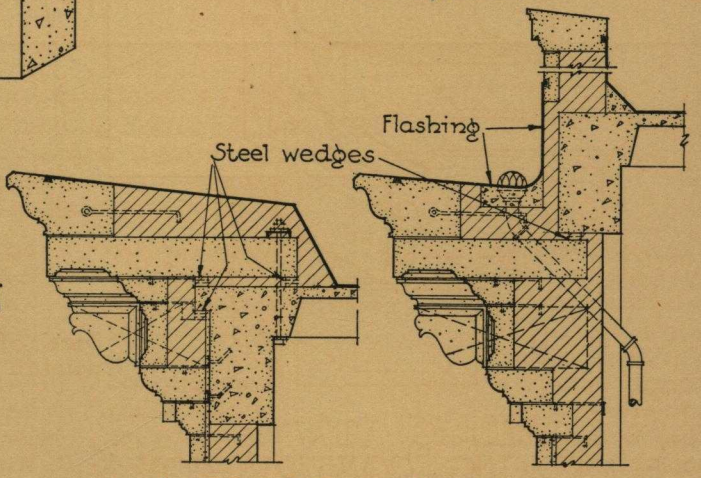


PLAN A-A
(Looking up)





ISOMETRIC VIEW
SHOWING CONSTRUCTION



ALTERNATE SECTIONS

SCALE 0 3" 6" 9" 12" 18" DATE - APRIL - 1926	DETAILS OF INDIANA LIMESTONE CORNICES ITALIAN RENAISSANCE - REINF. CONC. CONSTR.	DRAWING NO. 30 SERIES D4 ~ 26

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DRAWING No. 29, CORNICE IN THE COMPOSITE ORDER

In this cornice the position of the upper beam behind the projecting courses calls for steel brackets to carry them. The brackets are bolted to the concrete beam opposite the joints in the stone, the exact position being taken from drawings supplied by the cut stone contractor.

The base of corona rests directly on the lookouts, and the top course may either be dowelled or be held in place by an anchor through a hole in the gusset plate, although there is little danger of it moving.

The modillions extend back to the concrete beam and are wedged down under the brackets, which they are directly under. If preferred, the modillions may be suspended by lewis anchors near their outer ends, which would allow their backs to be cut off in line with the stretchers between them. The only advantage of this is to save stock and to take weight from the projecting nose of the bed-mould.

As is frequently seen, the frieze course is indicated to be sufficiently high to contain a row of windows, with the top member of the architrave forming the sill course.

DRAWING No. 30, ITALIAN RENAISSANCE CORNICE

This cornice has a somewhat greater proportional projection than most of this type, and consequently the lack of corbelling calls for more positive support against overturning.

The large corona course extends right through the wall and is bolted at every stone to the concrete beam below. A continuous channel distributes the pressure so that the strain is not confined to the area immediately near the bolts. The absence of a parapet to weight down the back of the wall means that all resistance to the overturning of the cornice is transmitted from the beam by the anchor bolts. They should be of ample size.

The ashlar frieze is held in place by dowels dropped through holes in the shelf-angle bolted to the concrete beam. This angle, with the top of its horizontal leg level with the top of the ashlar, supports the dentil course, which is also anchored back to the masonry.

These shelf-angles, of which there should be one in every story or sometimes every third course in a tall building, should be placed very carefully, so as to carry the weight of stone on the structural frame and not on the courses of stone below. This purpose is defeated if they are not in exactly the correct position with relation to the stone, and if the stone has to be trimmed to fit them it often involves a good deal of cutting. A much more satisfactory way, and probably no more expensive in the long run, is to build the stone up to about a story height below the shelf angle, locate from it the exact position where the shelf-angle is to go, make a template of the bolts projecting from the concrete and punch the angle-iron to fit it. This saves the difficult exact placing of the bolts in the forms, saves re-drilling the angle-iron at the job and insures its correct position, and saves trimming or wedging of the stone to fit; most of these being last-minute jobs which mean delays in the setting of stonework.

The stretchers in the modillion course are quite thin, as the modillions themselves are closely spaced and extend well into the wall. Their corbelling action is of great assistance in carrying the stone above.

Continuous flashing from the roof up and over the back of the wall to a raglet in the top course of stone to prevent the entrance of moisture is advisable with this type of cornice. If the joints are well filled and pointed, no trouble should be experienced.

Should the pipe space in the building be thought too low or should the roof line be preferred at a higher level in order to add another story without increasing the total height, the beam can be raised to the under side of the large through stone course. The modillions are the only stones that would be much affected and there could be a shoulder on the concrete beam under which they could be wedged securely.

The beam can be raised still higher so that it comes above the corona base course. This, of course, renders the anchor bolt unnecessary, and the stone then need run under it only a few inches, being wedged down in place. It also means that the water will be taken off in a gutter outside of the wall face, with the stone cut out where the down pipes run through the wall. The beam will then be above the cornice and if it is not made into a parapet with a stone facing it should be completely covered with sheet metal.

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The NATION'S BUILDING STONE

INDIANA LIMESTONE

Series A-3	SPECIFICATION DATA INDIANA LIMESTONE SERVICE PUBLICATION	Number 6

Specifications and Descriptive Notes on

Random Indiana Limestone Ashlar

as produced from the Rough-sawed "Old Gothic" or Short-length Classifications of this Stone, for the facing or building of Moderate Cost Masonry Walls

The form of Specification recommended for this class of Masonry, will be found on page 3, with explanatory notes on page 2.

The wall construction and facing schemes that are embraced within the scope of RANGE WORK, RANDOM ASHLAR, etc., as covered by this Specification, are many and varied in detail and effect, and cover a wide field of usage in buildings of many different types. These forms of stone wall work are especially adaptable for church, scholastic and institutional buildings of all kinds, as well as for residences, and in fact also for all other classes of buildings for which a somewhat informal architectural style is considered most suitable.

The architect will find that this form of construction is decidedly economical and possesses a great many advantages that are worthy of careful study. On account of the saving in labor that is afforded by the use of material already squared to the exact height and thickness of the different units required by the particular jointing scheme adopted, this rough-sawed Limestone Ashlar Facing will frequently be found less costly and more effective in the finished building than walls built of or faced with cheap local stone; especially so, as the facing units may be dimensioned to fit and bond with the brick or tile backing units; and also, by reason of the well-known easy-working qualities of INDIANA LIMESTONE, which make possible the breaking and trimming of the sawed stone strips to the required lengths at a minimum of labor cost.

The Rough-sawed "Old Gothic" and "Short-length" classifications of INDIANA LIMESTONE, in strip form, gives the Architect a wider range of choice in the employment of stone for the facing of buildings, by filling the gap that has heretofore existed between the regular Cut Stone Ashlar on the one hand, and the rougher types of stone wall, built of local field or ledge stone laid up as Rubble work or other form of rock-faced masonry, on the other. It also affords a means of using stone in an economical manner for buildings of moderate cost, for which any form of "Cut Stone" facing, however desirable, might sometimes be considered as involving an unwarranted increase in the cost.

For further information and data address the Association Service Department at Bedford

Architects' File:
A. I. A. Classification No. 8 b 2

EXPLANATORY NOTES

Note A

This specification should preferably be included under a separate heading of its own, as given on the opposite page, or be made a part of the General Masonry Specification under a similar sub-heading, so as not to form a part of the Cut Stone Specification.

Note B

This sawed-four-side "Old Gothic" or the "Short-length" classifications of INDIANA LIMESTONE may also be used where a rock-face Random Ashlar is required. In such cases for a facing with 4" bed, the stone would be sawed to a thickness of 10", 11", 12", or more, according to the amount of rock required on the face, and then be split apart on the job giving two rock-faced slabs with sawed beds, and backs. After these strips have been jointed off to the required lengths, the rock face is pitched off to a line parallel with the back.

Or, as an alternate, sawed slabs, costing less f. o. b. the quarry than the sawed-four-side material, may be used for rock-face work, involving a little more labor in the breaking of them to size at the building and some additional waste.

Note C

Where the desired design has not been fairly well indicated on the drawings, it is advisable to add the following clause to the first paragraph: "The length of Random Ashlar units generally shall not be less than 1½ times their height (except for closures) nor more than 3½ times their height." Lengths up to 4½ or 5 times the height are frequently employed however where the heights are moderate and a horizontal effect desired.

Note D

The requirement for bond stones will vary somewhat with the ashlar design and the heights of units employed, and a small section of the wall should be carefully detailed to determine this. These units should generally be worked out in multiples of the brick or hollow tile backing units. Under usual conditions, one fair size or two small bond stone in from 8 to 12 square feet of wall is considered sufficient.

Note E

The stone stock furnished under the "Short-length" classification will vary from 3'-6" to 5'-11" in length. Where greater length of stock is required the ashlar must be cut from full dimension quarry blocks, either of the "Old Gothic," or of one of the regular grades and the short-length classification will not apply.

Note F

This provides for the more regular and usual form of Random Ashlar. Where the irregular form with the angular end joints is desired, omit the word (**vertical**) and substitute either the words (**irregular**) or (**hammer broken**).

Note G

It is not practicable nor desirable to require joints less than ⅜-inch thick for wall facing of this rough sawed material, and this thickness is recommended as the minimum, ½" joints being specified for the ordinary run of work. For rock-face work, or where a rougher effect is desired, a joint wider than ½-inch is often preferable. For rough, irregular work, where the end joints are not vertical but are pitched off at an angle with the bed, fairly wide joints should be specified; average ¾" joints are not too wide.

It is not intended that the joints be raked out and pointed later, but that the work be laid by the masons with a full joint, either struck off flush; struck weathered; or slightly raked back at the time of setting.

Note H

A struck weathered joint, finished as the stone is set and requiring no pointing up later on, is here specified, as it is considered the most appropriate type of mortar joint for stone work of this character.

As an alternate to this and especially when the joints are not either very wide or irregular and where it is considered advisable to accent them, a slightly raked out joint may be specified. For a raked joint, especially if wide, an unusually stiff mortar will often be found necessary.

Brief description of the two grades recommended for this class of masonry facing.

The "Old Gothic" classification is unselected as to color and texture, and embraces the Gray, Buff and Variegated stone, which although varying in texture from fine to coarse will generally be of fairly coarse texture, some pieces containing shelly formations, white or crystalline streaks and tight crow-foot, etc., that do not affect the structural soundness of the stone. It is the grade embracing the widest range of variation in color-tone and texture.

The "Short-length" classification covers only the unselected, so-called short-length or cull blocks, and thus includes a somewhat wider range of variation in color-tone and texture than the regular "Variegated" grade of INDIANA LIMESTONE, but not as great a variation as the "Old Gothic" grade, as it will include a larger percentage of stone, the texture of which would be classified as standard, and less of the distinctly textured off-grade material.

SPECIFICATION

for Random Ashlar Wall Facing (See Note A) of either "Old Gothic" or "Short-length Variegated" INDIANA LIMESTONE, with Sawed-finish

All exterior wall facing; except Cut Stone trim, which is elsewhere provided for under the heading of "CUT STONE WORK"; shall be of "Old Gothic" (*see note below*) INDIANA LIMESTONE, sawed on four sides in the several heights required and be laid up in Random Ashlar, as indicated on the (*detail*) drawings, with the finish as it comes from the saw. (See Note B)

Note: As an alternate to the "Old Gothic", stone of the Short-length Gray, or Buff, or Variegated classifications, all of which embrace stone of varying textures, may be specified.

This facing shall be bonded to the backing as shown, having at least one bond stone four inches thicker than facing to each (*see note D*) square feet of wall. The units shall be arranged to bond properly with the Cut Stone quoining at corners, window jambs, etc., and to fit in generally with the bonding scheme of Cut Stone trim throughout. (See Note C)

All stone for this purpose shall have faces square and be furnished in lengths of not less than 3'-6", which shall be broken up and jointed on the job to the sizes required. All stone shall be set with level beds, shoving each block onto a full bed of mortar. End joints shall be (*vertical*) and be worked off fairly square with the face of the stone, and shall be properly staggered. All joints shall be ½" thick, weathered joints well filled with mortar struck full to the face of stone as the blocks are set. All stone shall be carefully back-plastered with a thick coat of the kind of same mortar that is used for setting. (See Note E) (See Note F) (See Note G)

All mortar droppings adhering to stone shall be immediately removed and the face of stone along all joints be sponged off clean as the work is set. (See Note H)

The specification for setting mortar and for backing up of stone should then follow.

(See Note which follows)

Unless the INDIANA LIMESTONE is both aged and thoroughly saturated at the time of setting, to obviate surface absorption, ordinary gray Portland cement will cause discoloration of the stone and often efflorescence which may finally result in some surface disintegration. For that reason its use cannot be recommended, even where the resulting discoloration is not considered objectionable but desirable, in giving the work artificial age effects.

Both on account of this frequent resulting staining of the Limestone and because of its other detrimental effects on any light natural stone, ordinary gray Portland cement should never be used in stone setting mortars.

Lime mortar, similar to that employed for Cut Stone work is therefore recommended for this class of work and for the parging or immediate backing up of it. Where the use of lime mortar is impractical for any reason, a lime-cement or cement-lime mortar made with a non-staining cement, should always be used; unless the uncertain and varied staining effect produced by most common cements is considered a really desirable element in the design. In such cases, particular mention of the careful back plastering required in connection with the setting of the Cut Stone trim, should be made in the specification for that portion of the work.

Some of the most important rules in the laying up of RANDOM ASHLAR work, are as follows:

1. All horizontal beds should be approximately level.

2. End joints to be a little off the vertical without being inclined at a distinct angle.

3. Stones to have the sharp corners knocked off.

4. The end of one stone may have 2 or 3 stones butting against it but in no case is it advisable to have 2 or 3 stones abut against more than one stone, making what is termed a block joint.

5. No straight horizontal bed should be longer than 6 feet in average work.

6. Stones generally should be at least 1½ times as long as they are high.

SURFACE FINISHES

In addition to the sand-sawed finish produced by the gang saws, which is specified as the standard for this class of work, and the more costly rock or split face finish which is produced as outlined in Note "B," page 2, the Architect has available other types of sawed surfaces that may either be used throughout, or be distributed through the work to give a further variety to the texture of the walls.

These are the surfaces produced by the wire saw, the diamond saw and the carborundum saw.

In addition to these, where an unusually rough surface is desired, one of the gang-sawed finishes called "Ripple-face" finish, produced by the addition of shot or crushed steel to the sawing sand, may be employed. Finishes of that character, giving an unusual amount of texture to the wall, although not costly, are not produced by all operators, and will generally cost a little more than the regular sand-sawed finish; especially if the return heads must be finished in the same manner, as this adds considerably to the production cost. Apart from that, any of these finishes may be considered as decidedly economical machine-produced finishes that are available when the rough sawed-four-side stone of any grade is to be employed.

The architect thus has a wide range in the choice of textures, varying from the fairly smooth fine sand-sawed surface, to surfaces torn and grooved with the larger sizes of steel shot.

The term "Short-length" is not intended to imply the full range of color-tone and texture, or especially stone of a grade which is the least uniform in color-tone, such as the "Old Gothic."

A certain percentage of moderately fine texture stone will be found in the "Short-length" classification, while there will rarely be much stone finer in texture than a fair average of Standard in the "Old Gothic" grade.

SECOND REVISED ISSUE OF AUGUST, 1925

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